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**CHOOSE THE RIGHT DUST SEPARATOR** p.33

ISSUE 269 SEPTEMBER 2020

Better Homes & Gardens.

# WOOD®

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### Plus More Great Plans

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- Simple CNC Two-faced Trivet p.48
- Mid-century Armchair p.56

**SHOP TEST: Mid-range Tablesaws** p.40

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⚠WARNING! †1

**G0894 ~~$5995.00~~ SALE $5395.00**

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## 10" 2 HP PORTABLE TABLE SAW

### WITH ROLLER STAND

MADE IN AN ISO 9001 FACTORY

- Motor size: 2 HP
- Tablesaw type: Portable
- Blade size: 10"
- Maximum cutting height @ 90deg: 3-1/8"
- Maximum cutting height @ 45deg: 2-1/4"
- Maximum ripping capacity - right: 28"
- Table type: Aluminum
- Overall table size: 26-3/8" x 32-1/4"
- Shipping weight: 106 lbs.

Variable Speed Motor and Sanding Disc Option

⚠WARNING! †1

**G0870 ~~$475.00~~ SALE $445.00**

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MADE IN AN ISO 9001 FACTORY

- Motor: 2 HP, 110V, single-phase
- Swing over bed: 16"
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- Distance between centers: 46"
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- Spindle tachometer with digital readout
- MT #2 spindle & tailstock tapers
- Spindle bore: 3/8"
- 10 speeds: 600 - 2400 RPM
- Includes 6" faceplate, cup live center and spur center
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- Overall dimension: 72½"L x 19"W x 48"H
- Approximate shipping weight: 354 lbs.

⚠WARNING! †1

**G0462 ONLY $775.00**

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### 35TH ANNIVERSARY EDITION

MADE IN AN ISO 9001 FACTORY

- Motor: 2 HP, 110V/220V, prewired 220V, single-phase, TEFC capacitor 110V start induction, 60 Hz, 1725 RPM
- Amps: 20A at 110V, 10A at 220V
- Power transfer: belt drive
- Precision-ground cast-iron table size: 17" x 17" x 1½"
- Table tilt: 10° left, 45° right
- Cutting capacity/throat: 16¼" L of blade
- Max. cutting height: 12⅛"
- Blade size: 131½" long
- Blade width range: ⅛"–1" wide
- Footprint: 27" W x 17¾" D
- Blade speeds: 1700 and 3500 FPM
- Fully-balanced cast aluminum wheels
- Overall size: 32" W x 73" H x 32" D
- Approx. shipping weight: 342 lbs.

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**G0513ANV ~~$1075.00~~ SALE $975.00**

## 15" FIXED-TABLE PLANERS

New!

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- Motor: 3 HP, 230V, single-phase, 12A
- Max. cutting width: 15"
- Max. stock thickness: 6"
- Min. stock thickness 3/16"
- Min. stock length: 6"
- Max. cutting depth: ⅛"
- Cutterhead dia: 2⅝"
- Cutterhead type (G0890): 3-knife, HSS
- Cutterhead type (G0891): 4-row helical, 48 inserts
- Cutterhead speed: 5200 RPM
- Feed rate: 16 & 28 FPM
- Table size with extensions: 15" x 49"
- Approx. shipping weight: 375 lbs.

⚠WARNING! †1

**G0890 ~~$1395.00~~ SALE $1250.00**

HELICAL CUTTERHEAD

**G0891 ~~$1850.00~~ SALE $1750.00**

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- Overall height: 72"
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MADE IN AN ISO 9001 FACTORY

⚠WARNING! †1

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## 8" X 76" PARALLELOGRAM JOINTER

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- Motor: 3 HP, 230V, single-phase, 12A
- Precision-ground cast-iron table
- Size: 76" x 8"
- Max. depth of cut: ⅛"
- Rabbeting capacity: ½"
- Cutterhead speed: 5500 RPM
- Cutterhead diameter: 3-1/16"
- Fence size: 38" x 4-¾"
- Dust port: 4"
- 45° & 90° fence stops
- Approx. shipping weight: 470 lbs.

MADE IN AN ISO 9001 FACTORY

⚠WARNING! †1

**G0858 ~~$1725.00~~ SALE $1625.00**

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## 12" COMPACT SLIDING TABLE SAW

- Motor: 7.5 HP, 220V/440V*, prewired for 220V, 3-phase
- Full load amps: 20A/10A
- Main blade size: 12"
- Main blade tilt: 0–45°
- Main blade speed: 4000 RPM
- Depth of cut: 3 5/16" @ 90°, 2⅜" @ 45°
- Scoring blade size: 43/4" (120mm)
- Sliding table size: 63" x 12¼"
- Scoring blade speed: 8000 RPM
- Scoring blade tilt: 0–45°
- Max. rip capacity: 33"
- Length of crosscut: 63"
- Max capacity of crosscut fence: 681/2"
- Footprint: 45" x 35"
- Approx. shipping weight: 996 lbs.

MADE IN AN ISO 9001 FACTORY

⚠WARNING! †1

**G0820 ~~$4995.00~~ SALE $4495.00**

$299 SHIPPING

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# Sign here, please


With an abundance of time on my hands last spring thanks to COVID-canceled activities, I decided to tackle a shop purge. Away went the "must have" stuff that I rarely, if ever, used; the "that'll come in handy someday" detritus that never did; and the "I have no idea what this is or where it came from" junk.

Way up on a shelf I discovered an unopened box of miscellaneous stuff from Dad's shop. Judging by its contents, I'd guess he never did a shop purge.

In the box I discovered an old, scarred hand plane—a rusty No. 4 Craftsman, with alligatored finish on the tote and knob (neither of which, amazingly, was broken) and yellowed paint streaked along its sole. The name "Virg" scrawled neatly on several parts, including the tote, body, and frog, told me that it once belonged to my Grandpa, Virgil Campbell.

Instantly I knew I would never restore the old plane, because doing so would remove not only Grandpa's name in his own handwriting but also the patina created by years of his use. Grandpa is literally a part of this tool, and I can't wipe away that history.

As I thought about my good fortune, it occurred to me that this relic of my family history could have easily wound up in the donation box or given away. But because Grandpa (who apparently was quite worried he might lose parts of the plane) signed it, the plane took on more value to me than it would have for anyone else.

The same is true of the woodworking projects we make. Will folks a generation or two removed from the pieces you've built know they were handmade in your shop? Or will they end up in the thrift shop (or worse, at the curb)? That's why it's so important to sign your work.

Last Christmas I experimented with miscellaneous metals and epoxy resins to create a stylized "DC" medallion (*below left*) to inlay into the back or bottom of each project I make. Aluminum tubing forms the outside ring, halved brass tubing shapes the D and C, and black-tinted casting resin infills the space between.

I'll admit, my signature medallion isn't as obvious as "Virg" in explaining the provenance of a piece, but it's at least as legible as my handwriting. And I often add a handwritten "Love, Dad" and/or the year as a more personal touch.

The projects you make today are tomorrow's heirlooms, so make that connection to your projects for generations to come.

See you in the shop!



*Dave Campbell*
*dave.campbell@meredith.com*
*Facebook and Twitter: @WOODeditor*
*Instagram: @wood_editor*


▶See step-by-step how Dave created this medallion. Point your smartphone's camera at this code (no app required), or visit woodmagazine.com/medallions.



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# In This Issue of WOOD®

SEPTEMBER 2020 · ISSUE 269

## PLANS



## TOOLS & TECHNIQUES



## DEPARTMENTS








# READ WITH CAUTION

Does the tablesaw review on *page 40* make you pull out your wallet and frantically attempt to shove cash through the pages of this magazine in a reflexive attempt to purchase a new tool? First, that's not how magazines work. Or cash. And second, please avoid these additional tool reviews. Your computer will thank you. Not literally. That's not how computers work.

## AVOID THIS 6" JOINTER REVIEW

If you have a weakness for flattened, squared lumber, then you'll want to avoid the temptations offered in this thorough review of 6" jointers.
woodmagazine.com/jointerreview

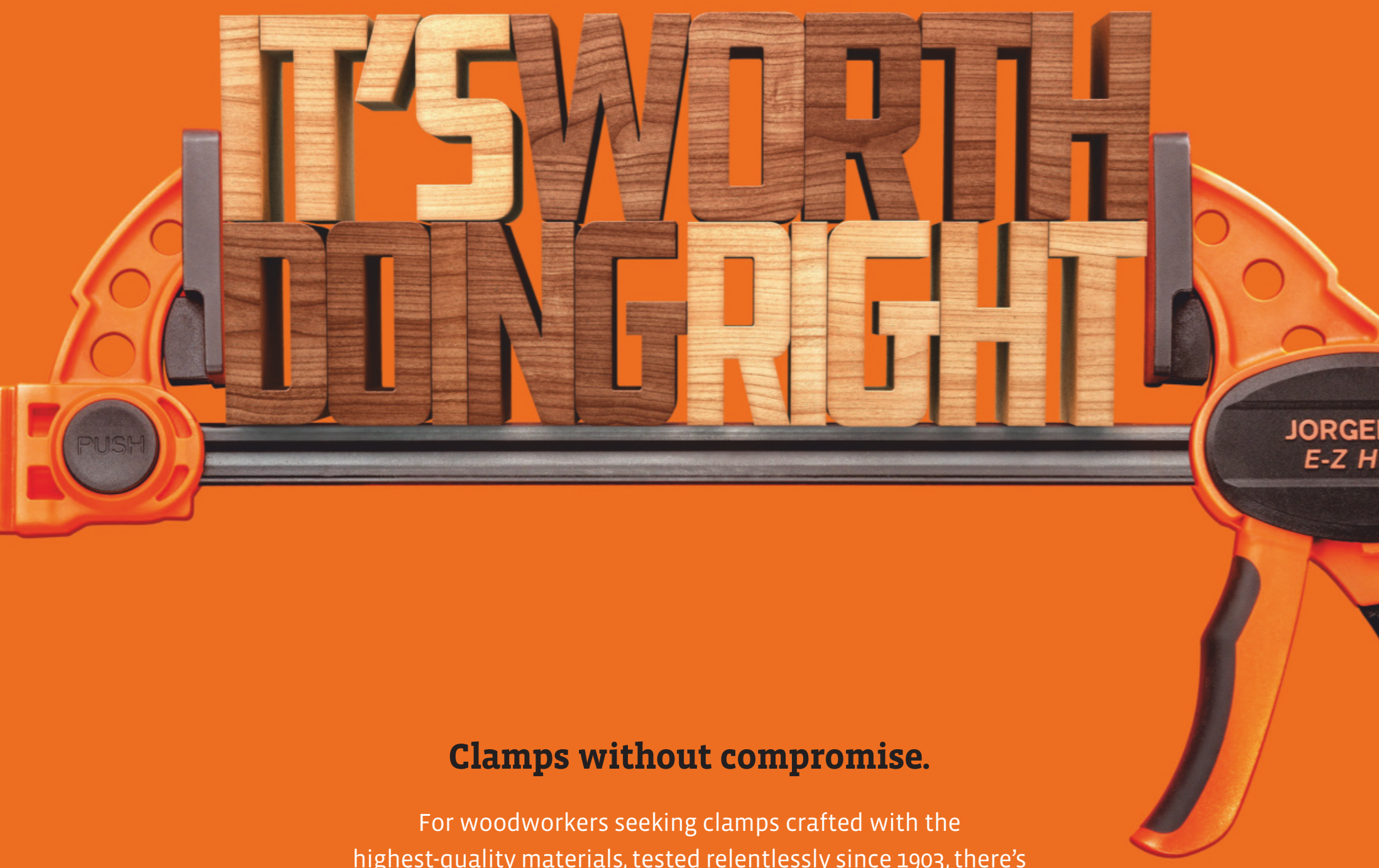
## AVERT YOUR EYES. MITERSAWS AHEAD.

Odysseus begged his plugged-ear sailors to release him to the Sirens. If you foolishly choose to read this review of 10" sliding mitersaws, follow his example and first tie your credit card to the mast of the nearest ship.
woodmagazine.com/mitersawreview

## SKIP THIS ROUTER REVIEW

The router is an essential shop tool, and these combo kits make them priceless. So it's essential that you skip this review. Because we lied: They actually do have a price. We warned you.
woodmagazine.com/comborouterreview

# IF IT'S WORTH DOING

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## It's kind of a big wheel

*For more than 50 years, I watched a complete wagon wheel rot away as it leaned against a rock wall adjacent to the 1726 gambrel-roof colonial home my father bought in 1968. Last summer I hauled the steel hubs, rim, and six remaining spokes from New England to my workshop in Florida so I could rebuild the wheel for yard art.*

*After researching the original construction methods for wagon wheels, I chose white oak for the rebuild and pinned together the perimeter sections with ½" steel rods to keep it authentic. When I completed the wheel two months later, it was too nice to put outdoors, so instead I turned it into a kitchen table. The center hub seemed the perfect place for a lazy Susan, so I designed one as a smaller wagon wheel. The tabletop itself is ½"-thick beveled plate glass.*

*I wish my father were still around to see the old wheel; it would have been nice to have him work with me. But I know that his spirit was with me.*

***—Brian Cote***
***Palm City, Fla.***

## A little bit of chamfering

*Your plan for the Optical Illusion Cutting Board in issue 266 (March 2020) suggests using a chamfer bit for spot-on 45° cuts. But the one I bought wouldn't chamfer the full thickness of the ¾" workpiece. I went ahead and cut the 45° bevel on my tablesaw, but it wasn't perfect. So, if I make another cutting board like this, what size chamfer bit should I get?*

***—Ron Wientjes***
***by email***

Think back to your high-school geometry, Ron, and remember that both legs of a 45˚ right triangle are equal length. Applied to router bits, if you want to completely chamfer the edge of a ¾" thick workpiece to 45˚, you need a bit with a radius at least ¾" larger than its guide bearing. The CMT 836.950.11 bit I used measures 2 9/16" in diameter, which, when you subtract the ½" bearing, leaves a little over 1" radius for cutting, so it will chamfer a board up to 1" thick.

You can buy the CMT bit at amazon.com by searching for the model number, or by pointing your smartphone's camera at this code. The Freud 40-118 and Whiteside no. 2310 also have sufficient cutting capacity.

John Olson, Design Editor


## Dave's dad

*I was in tears by the time I finished reading Dave Campbell's tribute to his dad in issue 267 ("Taking Measure," May 2020). I too lost my father to Parkinson's and Lewy body dementia six years ago. He didn't start woodworking until after I did, but I learned basic carpentry from him. I still have the first tape measure, tool belt, and carpenter's pencil he gave me when I bought my first house.*

*Our last project together was a small deer-hunting shack we built in northern Minnesota. Two summers ago we tore down the barn on his farm (built the year he was born) and kept most of the weathered wood siding. This summer, when we add to the hunting shack, we plan to incorporate the barn wood in the interior as a constant reminder of his wonderful legacy.*

*Thank you for sharing, Dave. Your dad had a lot to be proud of.*

***—Gerry Pavlik***
***Big Lake, Minn.***

*Dave, I can relate to all you wrote in issue 267 following your dad's passing: Your dad's "60" was an International Harvester 560 to mine. Your car radio was our milk-house radio. ("Cows milk better when music relaxes them," Dad would say.) It went without saying that "music" was one, and only one, station. As a teenager I tried changing the station. Once.*

*Thanks, Dave, for helping to "dust off" some very fond memories.*

***—Matt Bayly***
***Easton, Pa.***

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*continued on page 8*

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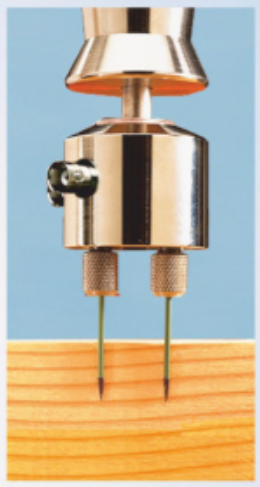

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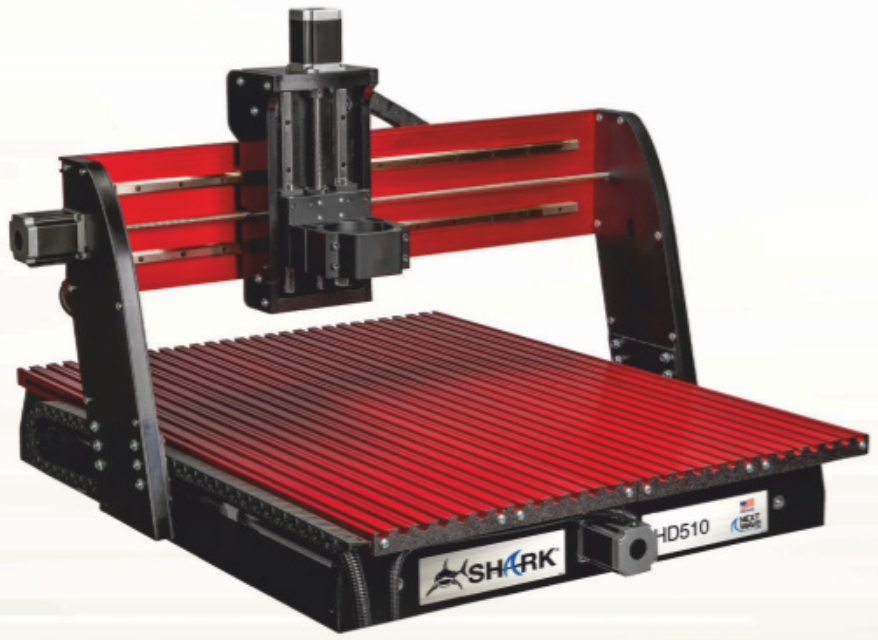


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# SOUNDING BOARD

YOUR VOICE

## Turners tout carbide's upsides

*Despite woodturning for about 10 years, I still consider my skill level as "beginner/novice." When I first started, I purchased nearly $1,500 worth of high-quality gouges and chisels like those described in issue 267 ("Ask WOOD," May 2020). Invariably, while finishing up a project, one of these tools would "catch" and ruin the piece.*

*And I found it difficult to keep those tools sharp because of their curved shapes and bevels. So I spent more time sharpening than turning, despite investing in several sharpening systems, none of which did the job for me. My interest and enjoyment in woodturning all but ceased to exist.*

*After mentioning to my wife about a carbide-tipped turning tools, she bought me one for my birthday. The first time the tool touched a spinning wood blank, I was sold. I gave away all of my traditional woodturning tools and purchased a couple of rougher/finisher/detailer sets and a parting tool from Easy Wood Tools (easywoodtools.com). When an edge gets dull, I just loosen the cutter screw and turn to a sharp cutting edge. No more worrying about tools "catching" or trying to keep them sharp.*

***—Russell Graham***
***Moscow, Idaho***

*I would suggest that the easiest route for newbie turners is carbide-tipped tools. Although I realize they are nothing but glorified scrapers and do little to teach proper turning technique, they allow a new woodturner instant access to turning without having to worry about secondary equipment, such as a grinder and tool-holding setup, or countless hours learning to sharpen the tools correctly. There is a real art in sharpening a proper fingernail edge on a gouge!*

*I have two decent sets of traditional gouges and skews, but my limited shop time almost always has me grabbing either a round or square carbide scraper. I save my gouges and skews for when I am working on a really nice bowl or hollow vessel because carbide cutters can tear out grain on those types of projects.*

*Thank you for continuing to make such a great woodworking magazine. I have subscribed to many others, but* WOOD® *magazine is always the one that gets renewed year after year. Keep up the great work!*

***—Lee Howell***
***Durham, N.C.***

Carbide-tipped turning tools tempt with their promise of easy use and no sharpening. But, as you point out, Lee, they are essentially scrapers that teach habits that will be difficult to unlearn when you graduate to traditional turning tools. For me, it boils down to using the right tool and technique for the job.

Let me give you a non-turning example: To smooth a board you can use a hand plane that requires frequent honing of the blade, precise and parallel projection of the blade, and care to ensure that the board's face stays flat. Or you can use a power sander that needs only abrasive and an outlet. Although the plane is fussier, it will always deliver a superior finish. Most woodworkers will be perfectly satisfied with the sanded finish. And that's fine.

If I want to make a bowl, I can use a lathe and any sharp tool (even sandpaper) and end up with a bowl. But if I want to learn the art of bowl turning, I should use a bowl gouge in order to learn the process. Learning to turn isn't making things on the lathe; it is using turning tools.

At the end of the day, if you're having difficulty achieving acceptable results with traditional turning tools, go ahead and scrape and sand as necessary. But also take the opportunity to learn how to use traditional turning tools on some practice pieces. Then, when you want to turn a set of table legs, you'll have the skills and tools to make them with confidence.

—Brian Simmons
*WOOD* magazine turning consultant

## Stable source of gift horses

*The rocking horses shown at* right *are the seventh, eighth, and ninth, respectively, I have built from plans in issue 83 (November 1995). These were gifted to nieces and nephews, but the first ones I built were donated to a fund-raising auction for our children's preschool, where they sold for $500–$600 each.*

*All were made to the original plans except that I widen the body to three thicknesses of 5/4 stock instead of the two thicknesses of ¾" stock called for. I've made templates for all of the parts, which makes them easier to cut out. I can just about make the horses now without looking at the directions, but I still refer to my dog-eared copy of the plans for verification of a few points.*

*Thanks for the wonderful inspiration. I have subscribed to* WOOD *magazine for well over 25 years, and never throw an issue away.*

***—Don Halvorsen***
***Hampton, Va.***

*continued on page 10*

Get the plans Don used to build his Playroom Palominos at woodmagazine.com/palomino, or by pointing your smartphone's camera at this code—no app required.

# Sounding Board

## YOUR PROJECTS

***Adam Brayshaw**, of Lake Clear, N.Y., needed a place in the entryway of his home to sit and slip shoes on and off, so he designed and built this settee based on one he'd seen in a house-plan magazine.*

*This walnut buffet, designed and built by **Marty Stover**, of Dayton, Ohio, features post-and-frame construction, mortise-and-tenon joinery throughout, and pullout wine racks that hold 12 bottles.*

***Roger Thrall**, of East Thetford, Vt., harvested from his own property the red oak in this Morris-style sofa built for a friend. The drawer fronts came from a single choice board; lidded cubbies under the cushions (not shown) provide additional storage.*

***David Donaldson**, of Anchorage, Alaska, turns custom batons for conductors, so designing and building this music stand out of cherry and ash seemed a natural extension. In the desk, David incorporated the line-and-berry inlay shown in issue 264 (November 2019).*

# Sounding Board

## YOUR PROJECTS

*A woodworker since the age of 10, **Rachel Cozzens**, of Upton, Mass., turned this captive-ring baby rattle for an expecting friend. The laminated maple came from shelving salvaged from a public library.*

*Retired math teacher **John Wesenberg**, of Milwaukee, demonstrated that "you do use math in real life" when he scaled down the Barn Door Entertainment Center from issue 257 (November 2018) to fit the 32" TV in his master bedroom.*

*Would you believe this is the first project **Patricia Sprague**, of Gaylord, Mich., ever built? Disappointed in the cost and quality of commercially made furniture, she "took a shot at it" when her son needed a dresser. Made of knotty pine, it features self-closing drawers. Patricia recently also completed a bed for her mother.*


*For the wedding of his daughter, Summer, **Joe Collins**, of Suisun City, Calif., gifted this chest he made from quartersawn white oak with walnut trim. The his-and-hers breakfast trays nest into the top of the chest.*

*Using plans from issue 155 (May 2004), **Gary Dean**, of Prince George, B.C., handcrafted three torpedo levels, one each for his two sons and his brother-in-law. Gary made all of them from tulipwood and brass.*

### Send us a photo of your work

*Want to see your work showcased in WOOD® magazine? Send a high-resolution digital photo of your completed project to woodmail@woodmagazine.com.*

# Garage Restoration

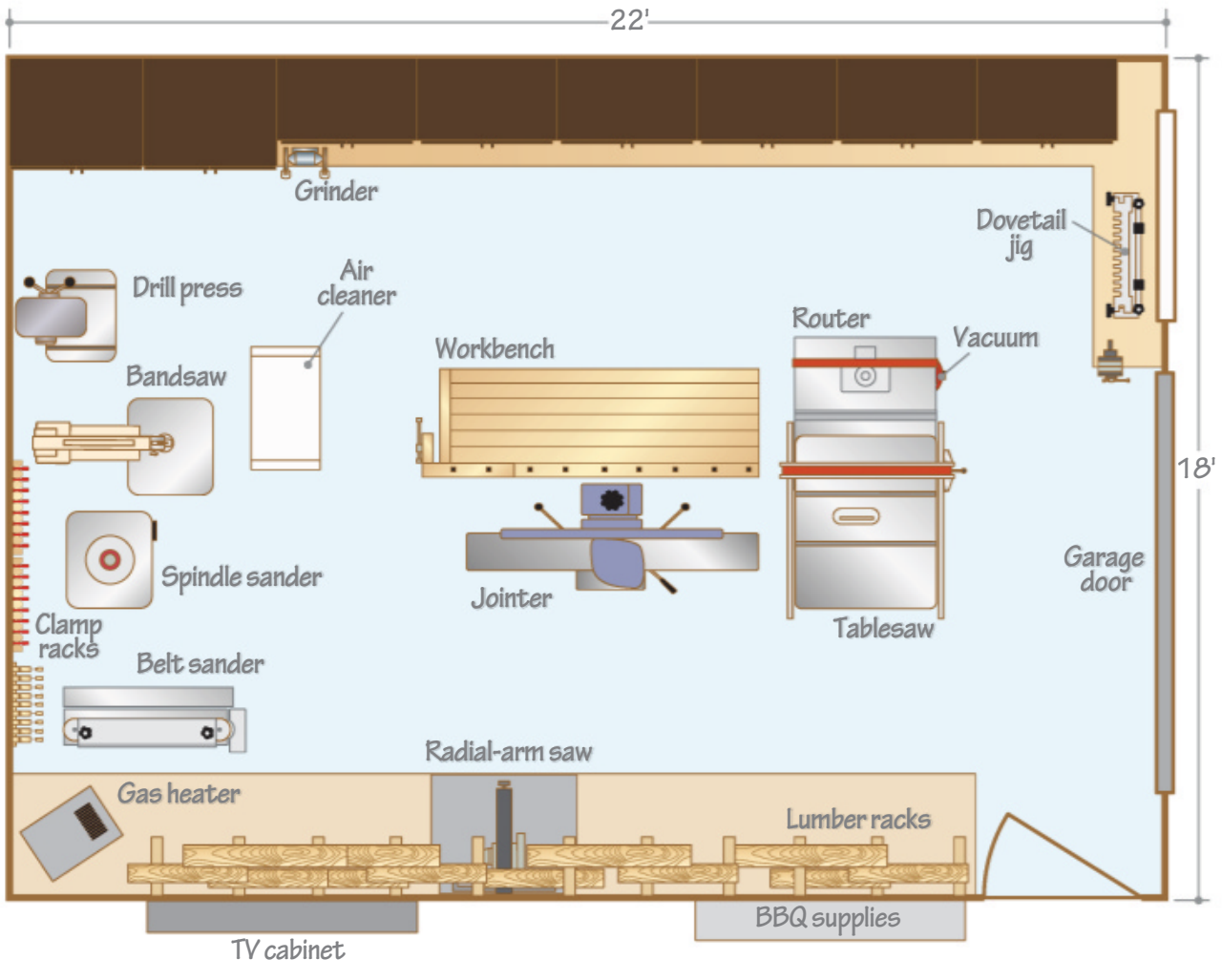
Blessed with an eye for potential, David Willett looked at his dark, unfinished 1½-car garage built in 1956 and saw the bones of a workshop. He envisioned a haven for woodworking, and after much hard work he achieved that, along with a place to hang out when cooking on the grill.

To begin the garage conversion, David ground the concrete floor smooth, filled the cracks, and applied an epoxy floor coating. After installing insulation, he hung drywall on the ceiling, and slatwall panels on the walls. An insulated garage door, gas heater, and window air conditioner keep the shop comfortable year-round. During humid months, a dehumidifier that drains outside reduces rusting on his tools.

David chose prefabricated RedLine cabinets (redlinegaragegear.com) to speed up his shop conversion and because he liked the powder-coated finish. He then built custom holders inside some of the drawers to keep tools organized and protected.

**With almost 400 sq. ft of shop space,** David has plenty of room to maneuver around his tools.

**Weathered cedar siding** gives David's shop a rustic appearance from the outside, but the interior glows, thanks to epoxy floors and plenty of light.



**The central tool "island"** maximizes floor space while providing easy access to each tool and the workbench.

Take one look at the shop and you'll see that plenty of storage, and David's knack for organization, keep the shop clutter-free. The slatwall panels provide highly configurable storage. David even found use for space behind the cabinets of his extra-deep radial-arm-saw station for storing long, narrow items, such as dowels.

David grouped his tablesaw (with a router table in the wing), jointer, and a traditional workbench at the heart of the shop, with the

**Custom slatwall brackets** hold David's collection of hand planes. PVC pipes behind the cabinets reclaim wasted space.



*continued on page 15*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bench also serving as an outfeed table. For general lighting, he worked with the Big Ass Fan Company (bigassfans.com), which helped him spec out the ceiling-mounted LED fixtures. Recessed can lights directly over the tablesaw "island" and countertops increase illumination in those spots; under-cabinet LEDs supply task lighting around the perimeter of the shop.

David has plans to add a room at the back of the shop for a dust-collection system. In the meantime, shop vacuums control dust.

When not in his shop, David enjoys spending time on the deck right outside, with its wall-hung outdoor TV and barbecue grill.

**A retired millwright,** David enjoys living near the Ohio river in Kentucky, where he manages and maintains several rental properties.

## Show us your shop

*Send high-resolution digital photos of your shop to* woodmail@woodmagazine.com *and we may showcase it in the magazine!*

## Q Air-drying lumber is more than a matter of time

A friend cut down two cherry trees, and I agreed to haul them away in exchange for the lumber. How long do I need to air-dry the wood before I can use it for furnituremaking?

*—Travis Woods, Mount Vernon, Va.*

**A** In general, Travis, air-drying green lumber reduces boards' moisture content (the ratio of the weight of the water in the wood to the weight of dry wood) to about 15-20 percent. This can take anywhere from six weeks to years, depending on the species, thickness, and local conditions.

Even then, you'll need to let the lumber continue drying for several more weeks or months in a space with a climate similar to where the finished piece will rest. So instead of a clock or calendar, rely on a moisture meter, available from woodworking suppliers, to determine readiness.

To watch a video about milling your own lumber, hover your smartphone's camera over this code—no app required—or visit woodmagazine.com/bandsawmill.

### First things first

Mill the logs into boards, ideally no more than 2" thick and 12" wide—thicker boards take longer to air-dry. Seal the ends by brushing on a commercial end-sealer, latex paint, or wax to slow the escape of moisture through the end grain and minimize end splitting. At this point, the moisture content can easily exceed 100 percent.

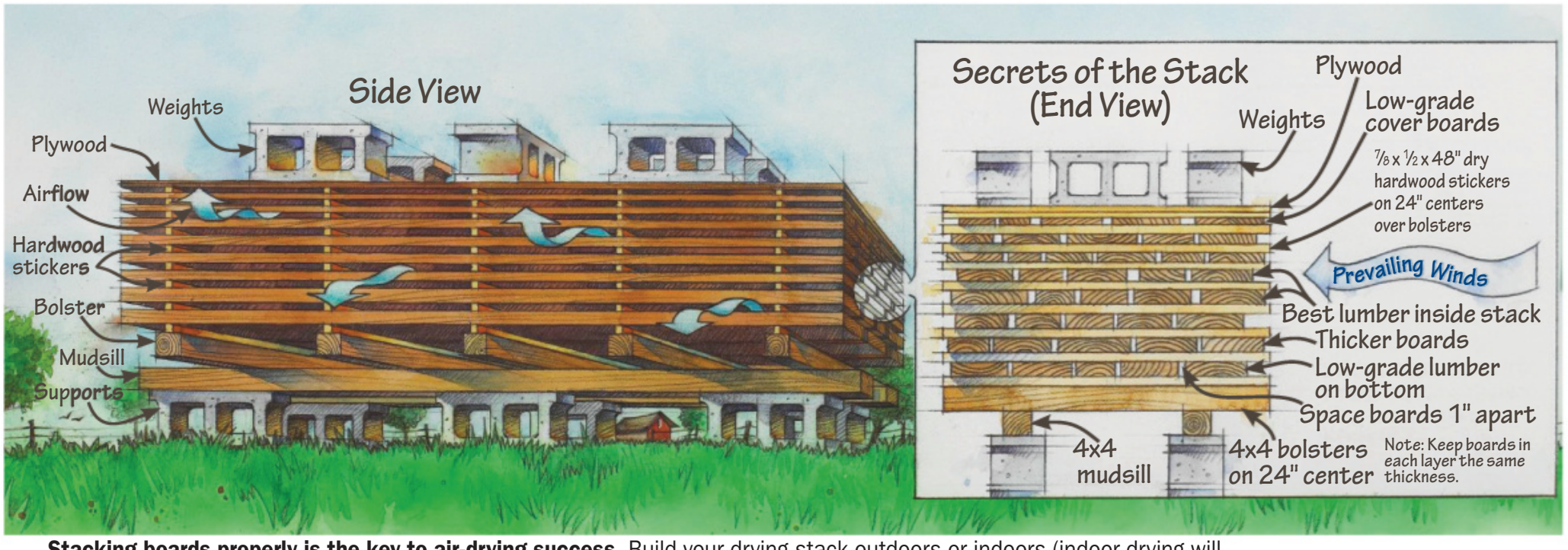
Stack the boards as shown *below* with stickers between the layers to allow free airflow through the stack. Cut uniform stickers from dried hardwood such as poplar or soft maple. After stacking the boards, just leave it to nature, taking periodic meter readings until the moisture content stabilizes.


**Moisture meters give a direct reading** of wood moisture content. Electrodes on pin-type meters pierce the surface to take a reading by measuring the electrical resistance between the pins. Pinless meters rely on a sensor pad and an electromagnetic field.

### Using your lumber

Wood is hygroscopic—it constantly gives up and absorbs moisture to reach equilibrium with the surrounding environment, which can be in the single digits. Stock that is air-dried outdoors usually will have higher moisture content than the indoor humidity.

Avoid wood-movement problems with indoor projects by acclimating the wood to the inside conditions before building with it. Stack the lumber where conditions match its end use and test it with your meter until the moisture content stabilizes.




**Stacking boards properly is the key to air-drying success.** Build your drying stack outdoors or indoors (indoor drying will take longer), keeping the boards well off the ground, level, uniform, and fully supported. Protect an outdoor stack from rain and direct sun. Indoors, aim fans at the stack to promote airflow.

Have a question? Drop us an e-mail. askwood@woodmagazine.com

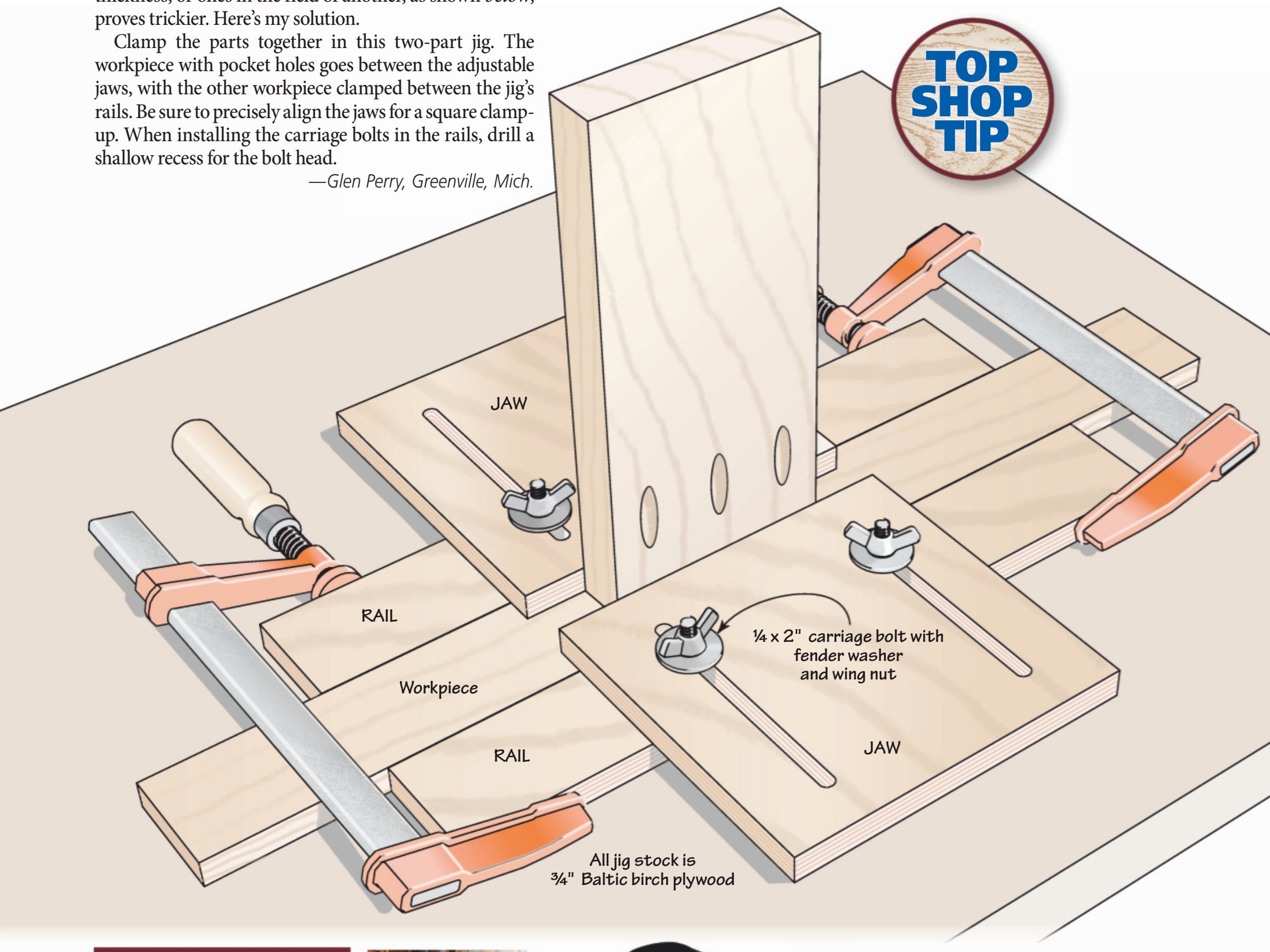
# Jig simplifies difficult pocket-hole joints

Commercial pocket-hole face clamps work well for parts of the same thickness aligned flush, such as a typical box corner or face frame. But clamping two parts of varying thickness, or ones in the field of another, as shown *below*, proves trickier. Here's my solution.

Clamp the parts together in this two-part jig. The workpiece with pocket holes goes between the adjustable jaws, with the other workpiece clamped between the jig's rails. Be sure to precisely align the jaws for a square clamp-up. When installing the carriage bolts in the rails, drill a shallow recess for the bolt head.

*—Glen Perry, Greenville, Mich.*

TOP SHOP TIP




## Tips earn up to $150.

If your tip is the best of the issue, it wins **Top Shop Tip** honors, and you receive a **tool prize** worth at least **$300**.

Send your tip, photos or drawings, and contact info to **shoptips@woodmagazine.com**

Because we try to publish original tips, please send yours only to *WOOD*® magazine.

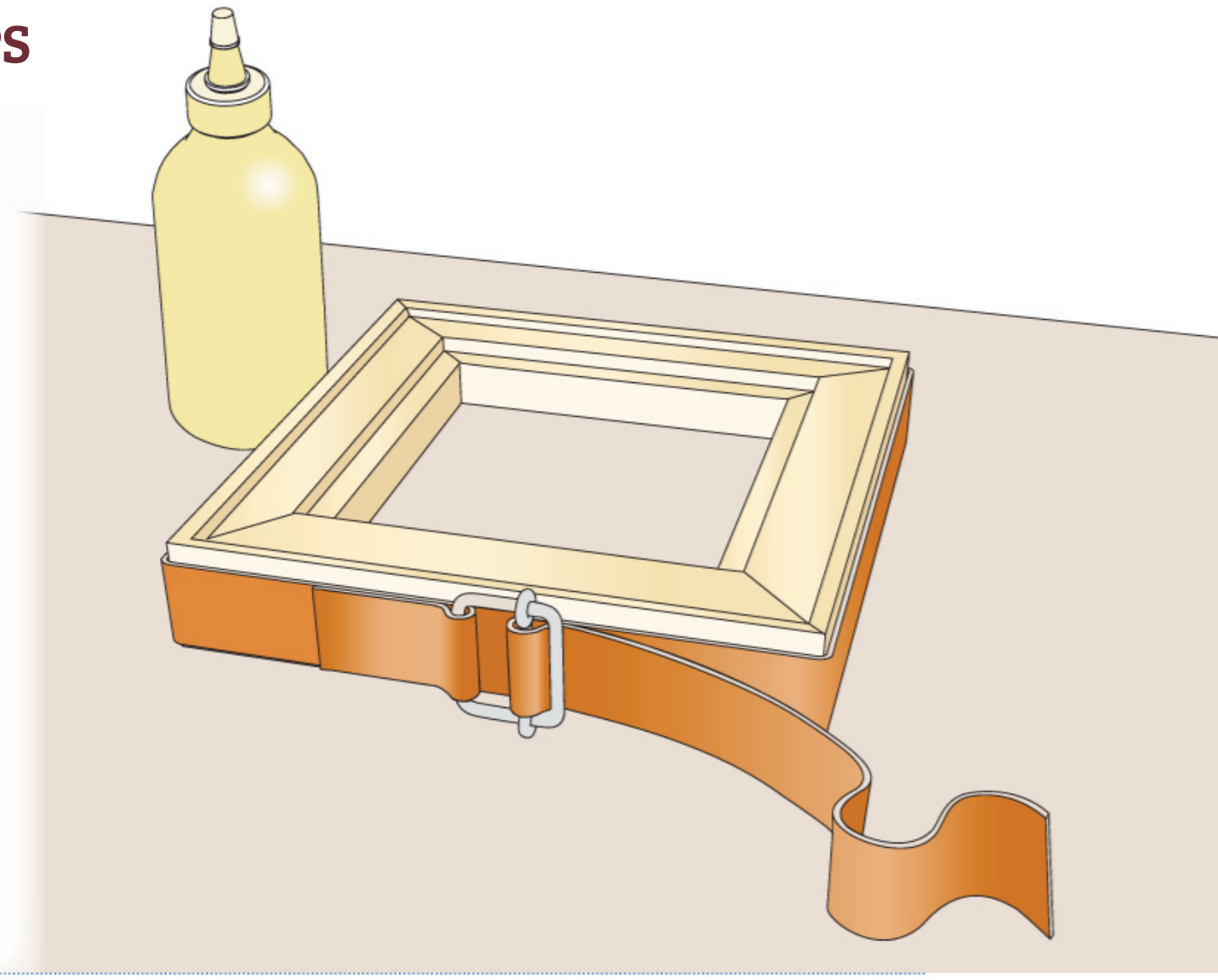

*For sending this issue's Top Shop Tip, Glen receives a Bosch 18-volt combo kit worth $400.*

## Buckle up for tighter miters

Rubber bands work fine for clamping tiny boxes and frames. Typical band clamps help you deftly handle medium and large projects. But for small boxes and frames sized between those two extremes, I find it best to use shop-made belt clamps.

Simply buy a length of canvas belt strap and a small adjustable-slide buckle at a fabric store. Sew one end of the strap to the buckle. Now pull together your glued box sides just as you would cinch up a pants belt. You can't beat the control or price of these clamps!

*—Phil ORourke, Pittsfield, Mass.*

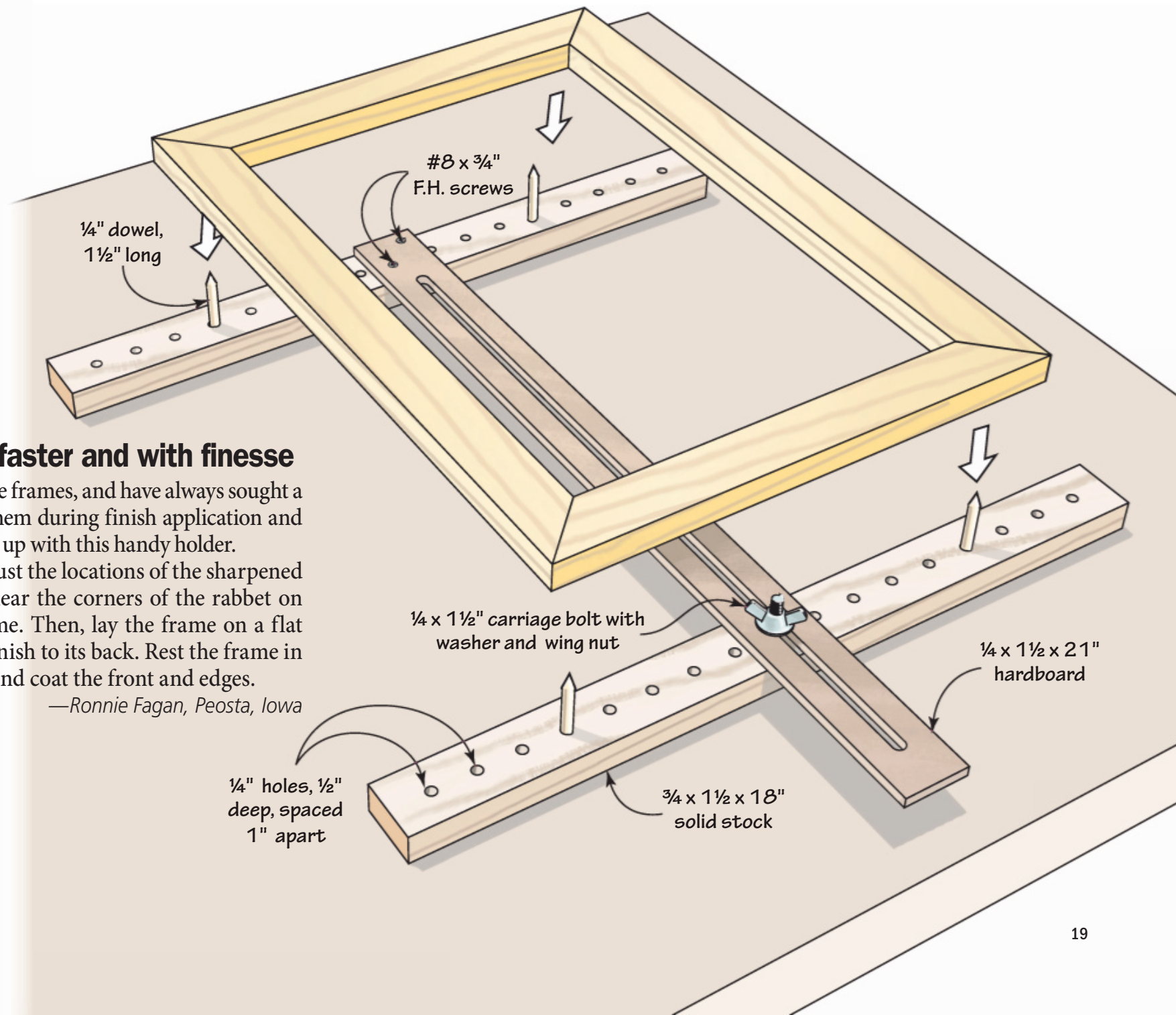


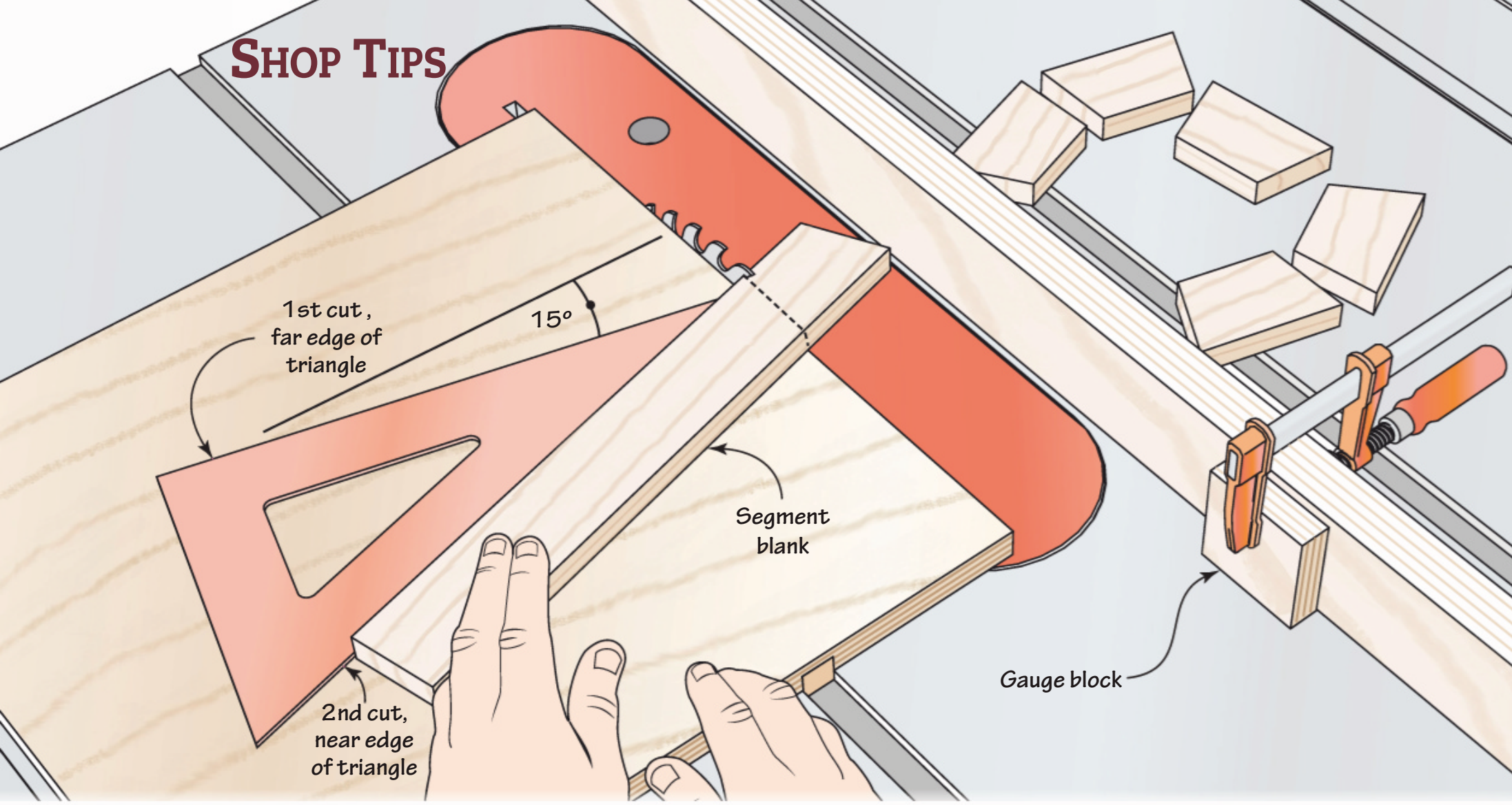
## Finish frames faster and with finesse

I make a lot of picture frames, and have always sought a better way to hold them during finish application and drying. Then I came up with this handy holder.

To use it, first adjust the locations of the sharpened dowels so they fit near the corners of the rabbet on the back of the frame. Then, lay the frame on a flat surface and apply finish to its back. Rest the frame in the holder face up, and coat the front and edges.

*—Ronnie Fagan, Peosta, Iowa*



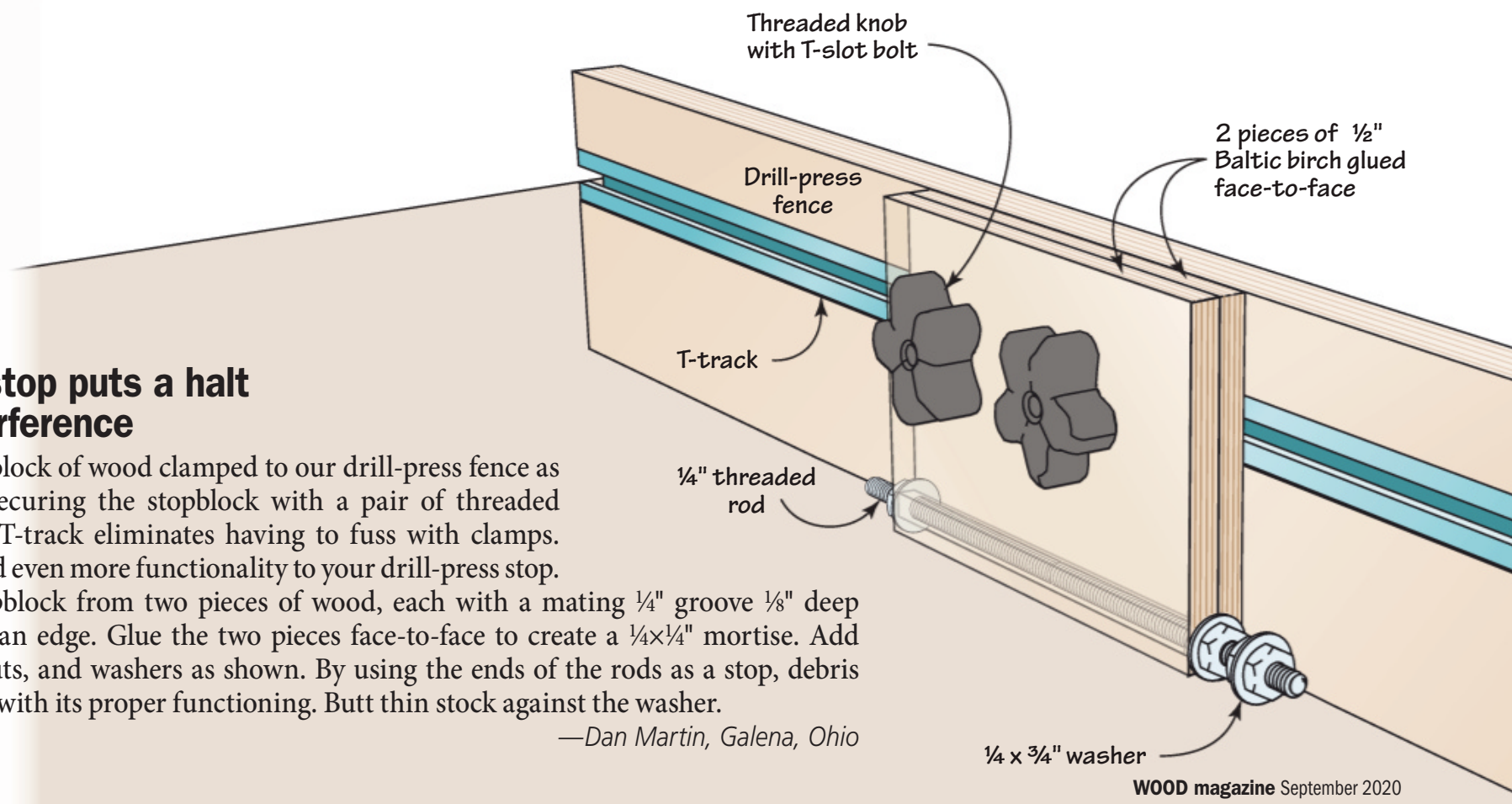



## Super-simple method yields dead-accurate pieces for segmented turnings

Despite many years working with wood, I found myself struggling to cut accurate segments to glue into rings for segmented turnings. An error as little as ⅒° in the angle of segment ends proved too much. Then I hit upon the idea of using a 30-60-90° woodworking triangle as part of a cutting jig for 12-segment rings (which require 15° miters on each end of the segments) and the problem evaporated. Like drafting triangles, woodworking triangles are incredibly precise, but made of plastic twice as thick (item no. 31545, $17, rockler.com or 800-279-4441).

To get started, use double-faced tape to attach the triangle to a tablesaw sled at a 15° angle. (The angle need not be exact.) Place the segment blank against the far edge of the triangle and cut its end. Now, secure a gauge block to the fence to set the length of each segment. Place the board against the near edge of the triangle, and butt its cut end against the gauge block. Push the sled forward to cut a segment as shown. Repeat the far-edge, near-edge sequence for the remaining segments. The angles, though they may not match exactly, complement each other and will fit flawlessly in the segment ring.

*—Bill Wells, Olympia, Wash.*




## Drill-press stop puts a halt to chip interference

Lots of us use a block of wood clamped to our drill-press fence as a length stop. Securing the stopblock with a pair of threaded knobs tied into T-track eliminates having to fuss with clamps. Here's how to add even more functionality to your drill-press stop.

Make the stopblock from two pieces of wood, each with a mating ¼" groove ⅛" deep spaced ⅜" from an edge. Glue the two pieces face-to-face to create a ¼×¼" mortise. Add threaded rod, nuts, and washers as shown. By using the ends of the rods as a stop, debris cannot interfere with its proper functioning. Butt thin stock against the washer.

*—Dan Martin, Galena, Ohio*

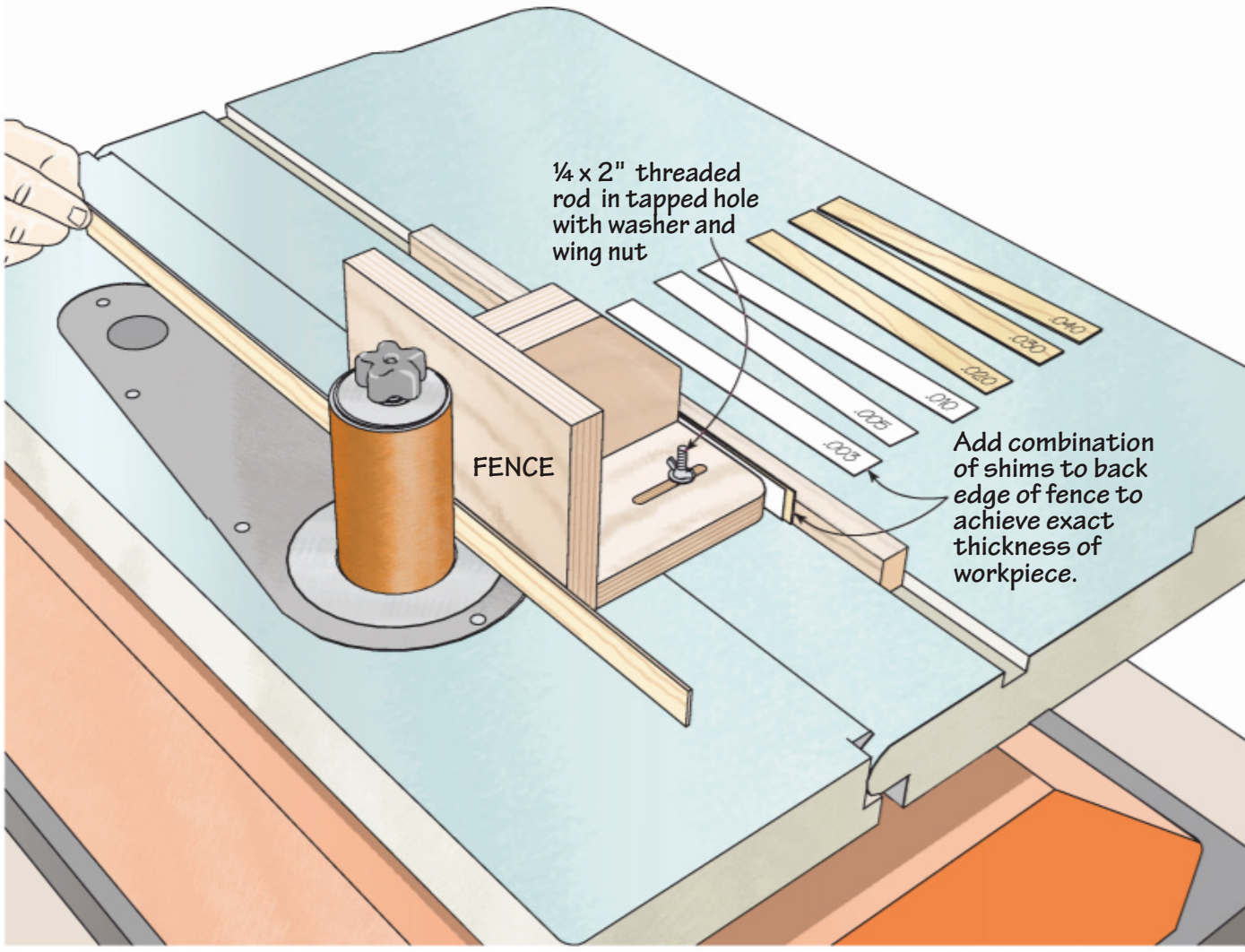
## Sand smooth and uniform thin strips

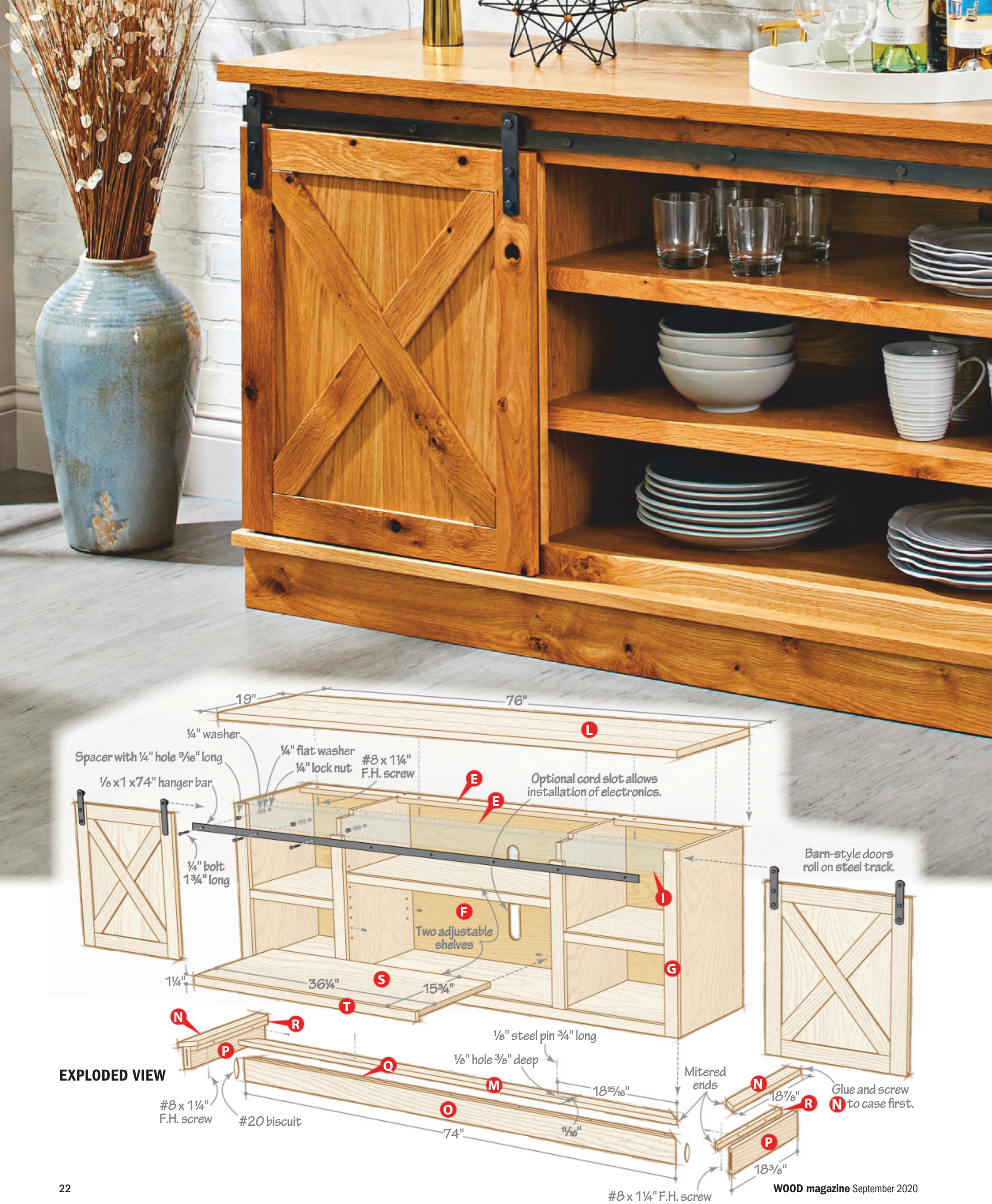
Shaker boxes require wood strips made to uniform thickness with smooth faces. To impart both of those qualities to your sawn strips, use an oscillating spindle sander.

First, build a simple right-angle fence with base from two pieces of ¾" material. The base should have a pair of parallel slots as shown. Add a couple of brace pieces for rigidity. Use the slots to mark the position, then drill and tap two holes into the sander table. Secure the fixture with wing nuts, washers, and threaded rod. If your sander has a miter channel, add a snug-fitting length of 1"-tall wood to it. Otherwise, clamp that wood in place, just behind the fence. Make a supply of paper and cardstock shims of various thicknesses. Outfit the sander with an 80-grit drum.

I like my finished strips .062" thick, +/-.002". To achieve that, rip the strips to about .090" thick using a bandsaw. Then, use one of the strips to set the fence-to-drum sander distance for a light sanding cut. Sand each strip and measure the thickness using a micrometer. Add a shim between the back edge of the fence base and the wood in the miter channel. Make another sanding pass. Repeat that process (most strips require 3–4 passes) until reaching the desired thickness.

*—Ken Taylor, Bradenton, Fla.*






**EXPLODED VIEW**


# Barn-door Buffet

## *Fine furniture meets rustic style.*

Increase storage and serving space in your dining room while adding a touch of farmhouse style with this oak sideboard. There's even room to conceal an audio system behind the barn-style doors so you can enjoy music with your meal.

Commercial rolling barn-door track and hangers proved too large, so we made a scaled-down version that relies on readily available—and inexpensive—steel flat bar stock and common hardware.

▶Watch three ways to drill shelf-pin holes. Hover your smartphone camera over the code above (no app required) or visit woodmagazine.com/shelfpinholes

***Note:*** *You don't need to decide about the slot right now; it's easy to cut it after assembly.*

## The carcase comes first

1 Cut to size the sides, partitions, fixed shelves, and bottom (A–D) [**Drawing 1**, **Materials List**].

2 Rabbet the back inside edge of each side (A). Notch the partitions (B) and drill shelf-pin holes in them [**Drawing 1a**].

3 Form biscuit slots in parts A–D, and glue the carcase together [**Photo A**].

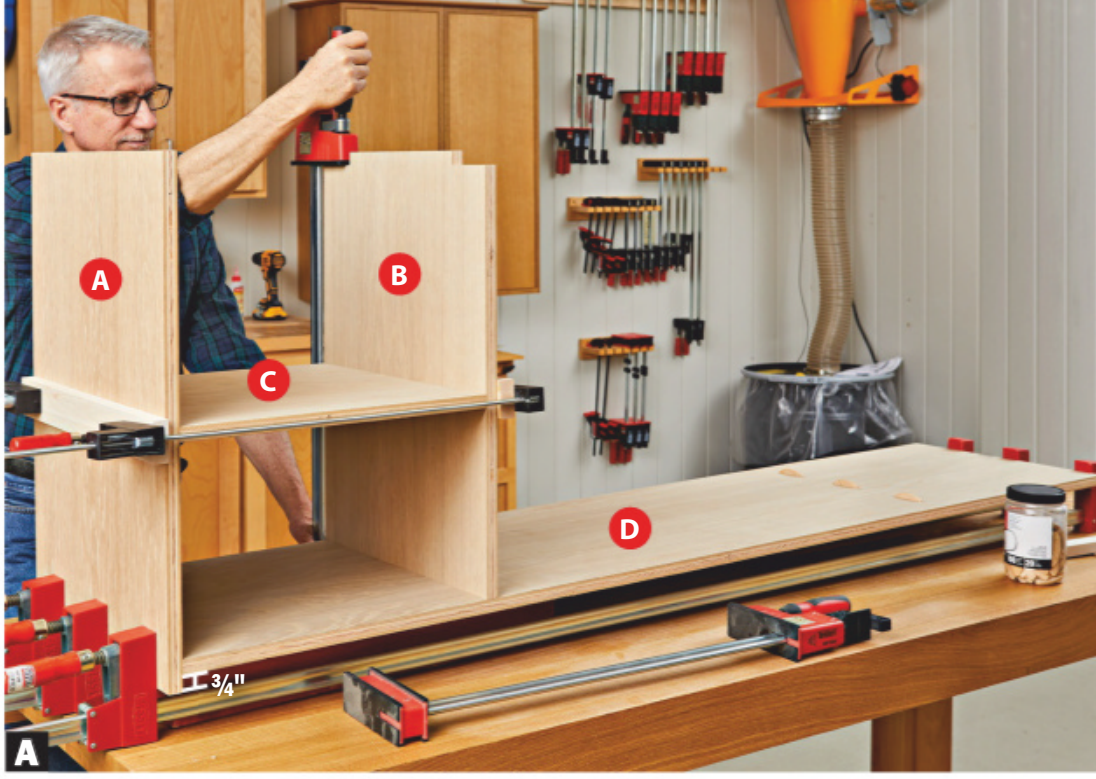
4 Cut to length the stretchers (E), drill pocket holes and screw holes [**Drawing 1**], and glue and screw them to the A–D assembly.

5 Cut the back (F) to size and set it aside. Form the slot in the middle [**Drawing 1b**] if you will put electronics in the center bay.

## Put up a good front

1 Cut the face frame outer stiles (G) about 1/16" wider than listed and the other stiles and rails (H–K) to size.

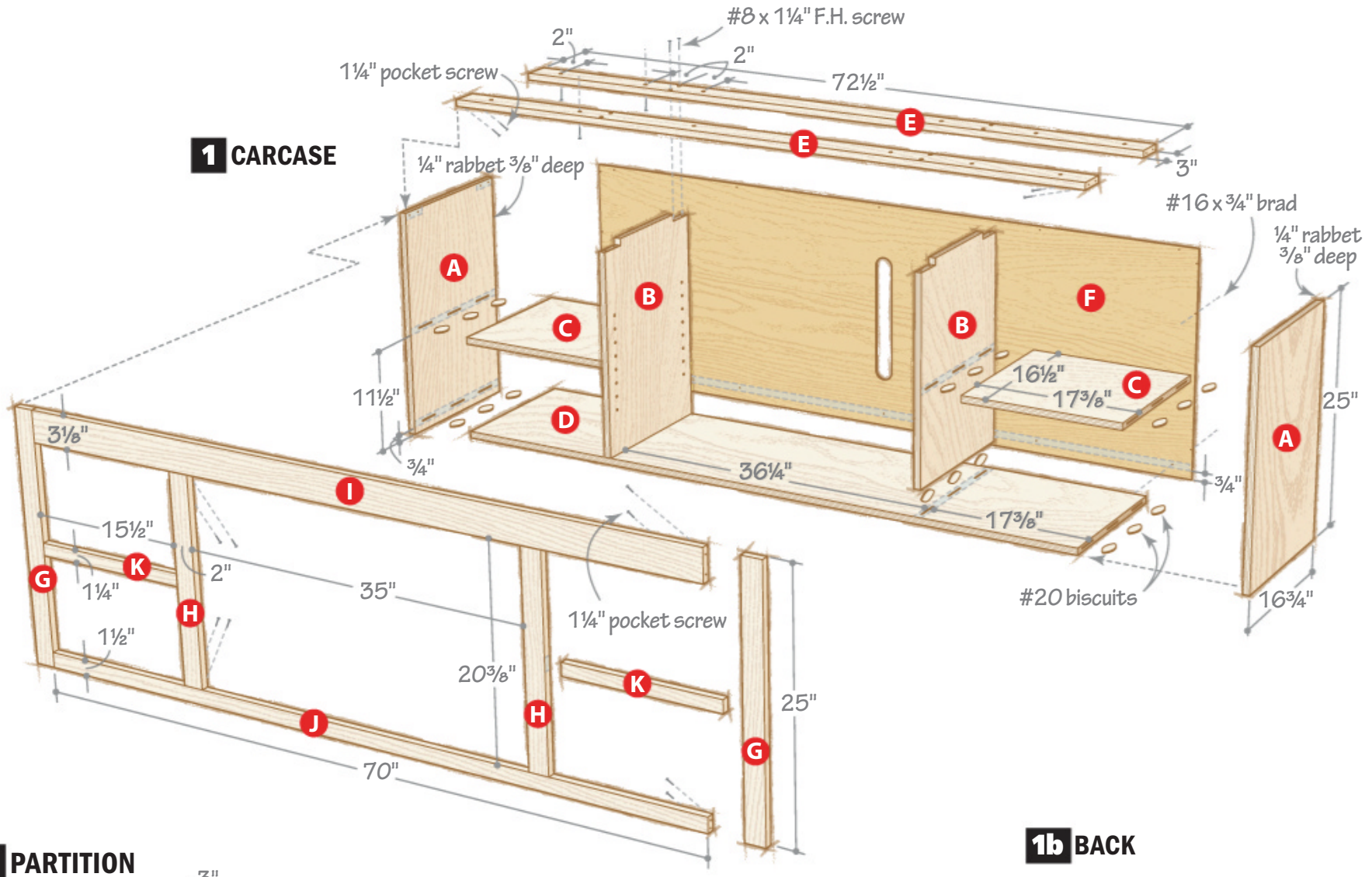
2 Drill pocket holes in parts H–J [**Drawing 1**]. Glue and screw the face frame (G–J) together (omit parts K for now).



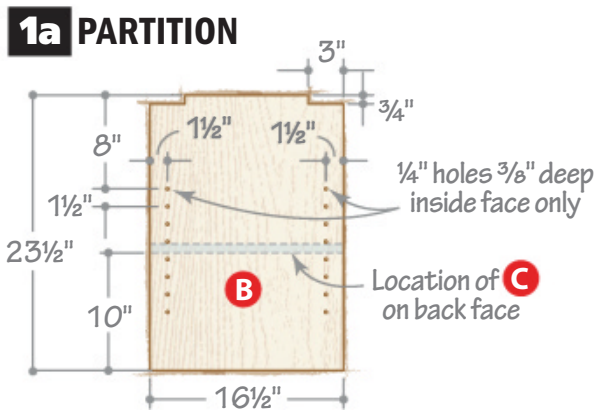

**Glue and biscuit** the sides, partitions, shelves, and bottom (A–D). Keeping the edges flush at the front, square the assembly and clamp.

3 Glue the face frame to the carcase, keeping the top rail (I) flush with the top edge of the front stretcher (E) and the bottom rail (J) flush with the bottom surface of the bottom (D). Equalize the overhangs at the ends.

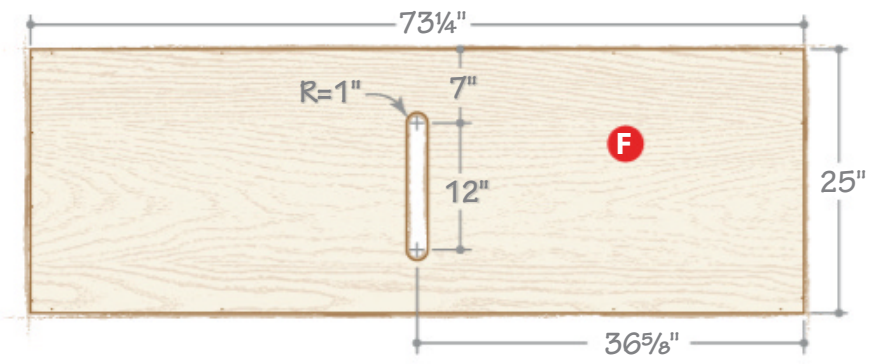
**1 CARCASE**




**1a PARTITION**




**1b BACK**



4 Glue the center rails (K) to the fixed shelves (C) [**Photo B**]. After the glue dries, flush-trim the outer stiles (G) to the outer face of the sides (A), attach the back (F) with glue and brads, and finish-sand the A–K assembly.

5 Edge-glue stock for the top (L). Cut the top to size, finish-sand it, and set it aside.

## Build a base

1 Starting with stock about 1" longer than listed, miter-cut the base front trim (M), side trim (N), front (O), sides (P), front cleat (Q), and side cleats (R) to length. Drill holes in the top of the front trim (M) for the door guide pins [**Exploded View**].

2 Turn the carcase upside down, then glue and screw the trim (M, N) to the bottom, flush at the back, with equal overhangs at both ends [**Exploded View**].

3 Cut biscuit slots in the base front and sides (O, P) and glue them together, making the corners square.

4 Glue and screw the cleats (Q, R) inside the base (O/P), flush at the top. Finish-sand the base.

5 Glue and screw the base/cleat assembly (O–R) to the bottom of the cabinet.

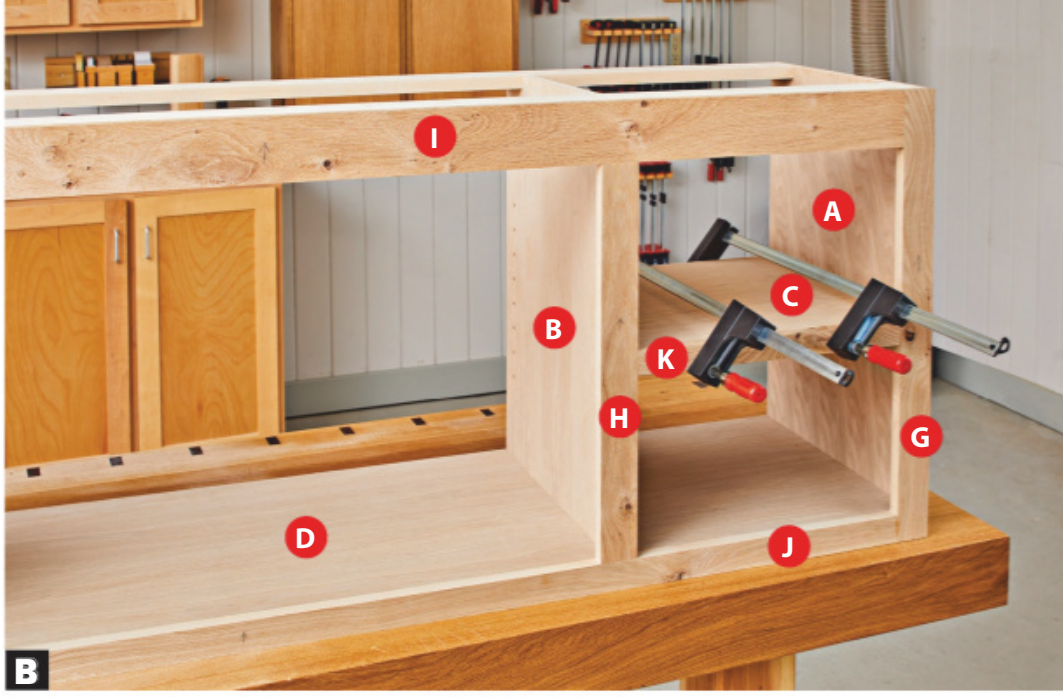
## Add shelves and doors

1 Cut to size the movable shelves (S) and edges (T). Glue an edge to the front of each shelf, flush at the top and ends [**Exploded View**]. Finish-sand the shelves.

2 Cut the door stiles, rails, and panels (U–W) and four pieces of stock ¼×2¼×32" for the crosses (X, Y) [**Drawing 2**].

3 Center a groove along one edge of each stile (U) and rail (V) to fit the thickness of the door panels (W).

4 Form stub tenons on the ends of the rails (V) to fit the stile (U) grooves [**Drawing 2**].




**Keep the center rail (K) top edge** flush with the fixed shelf (C) and square it to the face-frame stiles (G and H).

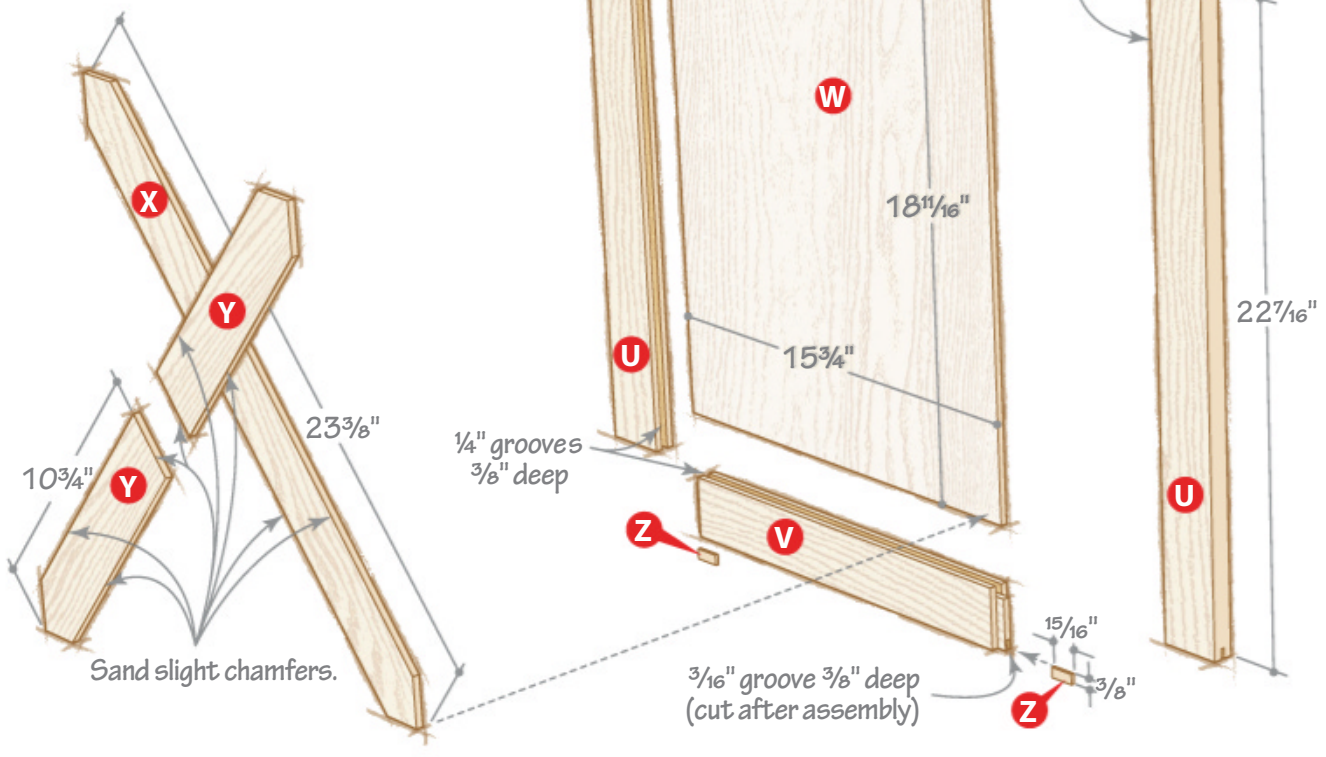
5 Dry-assemble the stiles and rails for both doors (clamp if necessary, but do not glue) and fit the long and short crosses inside the opening [**Skill Builder**, *next page*].

6 Chamfer the crosses (X, Y) [**Drawing 2**] to create shadow lines for a rustic look, finish-sand the door parts (U–Y), and glue together the stiles and rails around each panel [**Drawing 2**]. Glue the crosses to the doors.

7 Center a groove on the bottom of each door [**Drawing 2**]. Glue a guide stop (Z) into each stile groove at the outside edge. Touch up the finish-sanding as necessary.

***Tip!*** *Glue overwidth, overlength pieces into the door grooves for the guide stops (Z); then, trim them flush on the bottom and outside door edges.*

**2 DOOR**



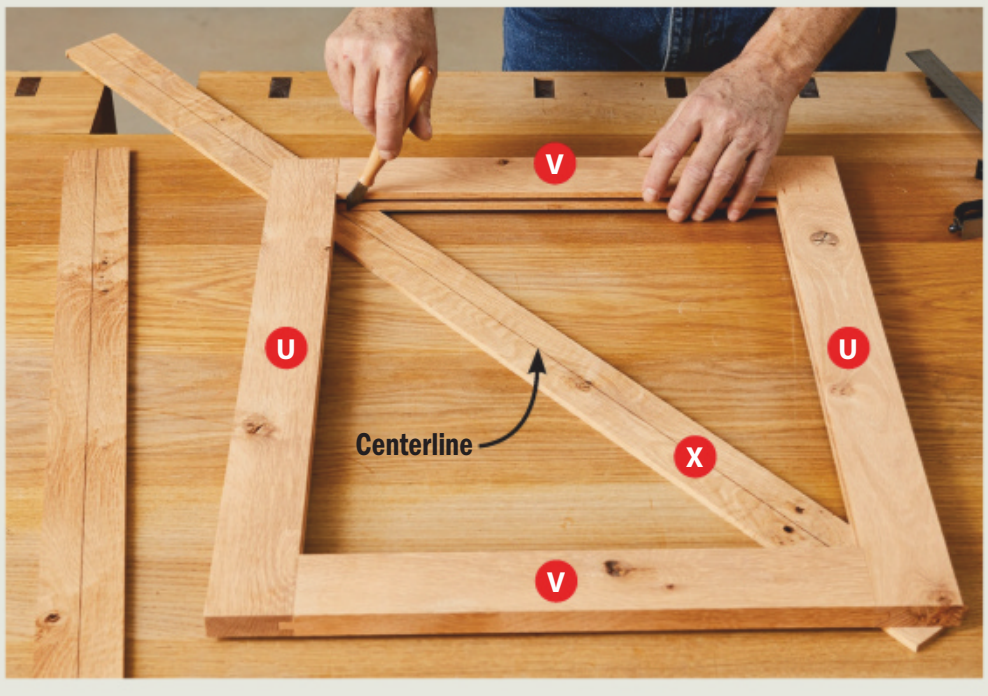
## Fitting diagonal pieces into a frame

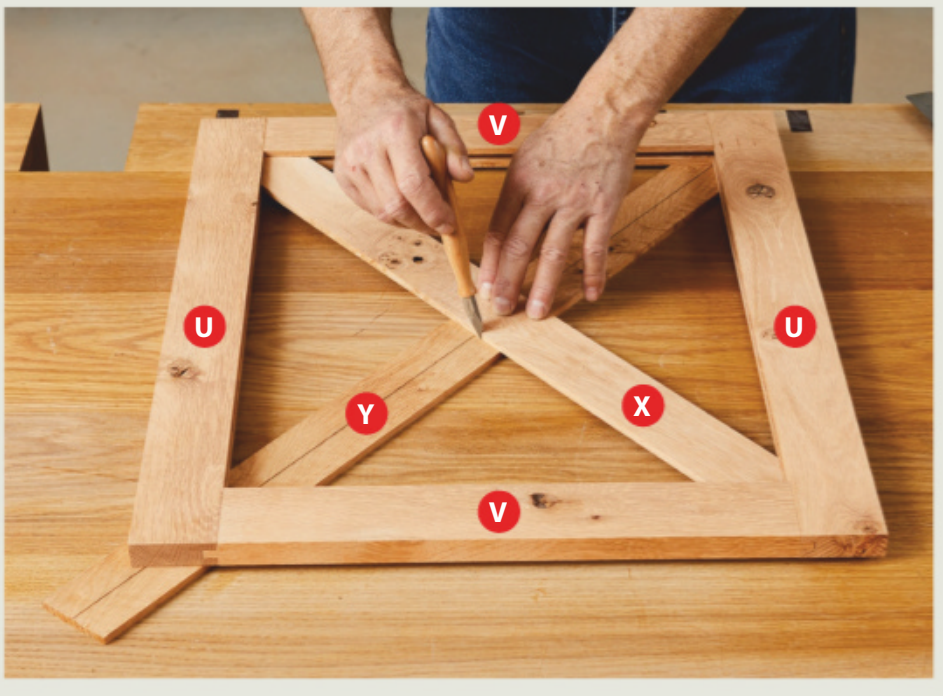
Direct marking simplifies fitting the diagonal crosses (X, Y) in the door frames. For consistent appearance, we oriented the long pieces (X) the same direction on both doors, from the top left corner to the lower right.

To fit the pieces, first draw a centerline the length of each door-cross blank. Then, lay one blank for part X faceup and place the assembled door frame over it (*below*), making sure the frame corners are tightly joined and square. Adjust the frame position to place the cross centerline in opposite corners. Scribe the cross ends at the inside edges of the stiles and rails with a marking knife or sharp pencil, and cut them. Trim to fit as necessary. Mark the part and frame for orientation.

Lay a Y blank faceup, place the frame over it and adjust as before. Place the long cross (X) in the frame and scribe the ends and intersection points onto the Y blank (*below, right*). Cut parts Y, trim to fit, and mark both for position.

Repeat for the other door.




**Note:** *We bought plain steel bar stock from a local steel service center.*

## Get the doors on track

1 Cut one piece of ⅛×1" flat steel bar 74" long, and four pieces to 5½". Sand or file to remove sharp edges.

2 Centerpunch the hole locations [**Drawing 3**]. Radius the ends on the door hangers.

3 Drill the holes in the rail and hangers. Remove burrs and sand both faces of the rail and hangers clean.

4 Temporarily clamp the rail to the front of the cabinet as a template, transfer the hole locations to the face frame top rail (I) [**Exploded View**], and drill the holes.

5 Cut lengths of ⅛" black steel pipe (nominal size; actual outside diameter is about 13⁄32") for the rail spacers [**Exploded View**], and sand them clean. Or, make wood spacer blocks to match the cabinet front rail.

▶You can finish the hardware with satin black spray paint instead, if you wish.

6 Apply cold bluing compound [**Sources**] to the rail, hangers, and steel spacers, following the manufacturer's instructions.

## Wrap it up

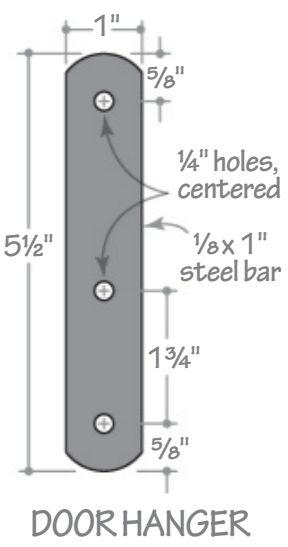
1 Touch up the finish sanding as needed. Then, apply a clear finish to the cabinet, top, movable shelves, and doors.

2 Attach the top to the cabinet [**Exploded View**], making it flush at the back with equal end overhangs.

3 Attach the door rail to the front of the cabinet and the hangers to the doors with black oxide-finished hardware [**Exploded View, Drawing 4, Sources**].

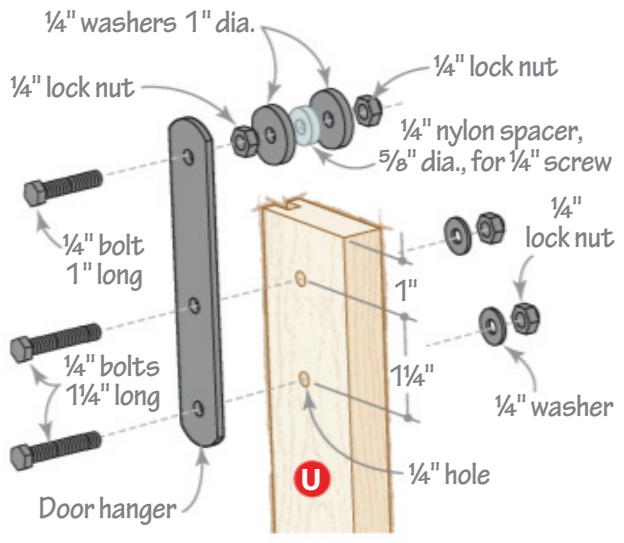
4 Assemble the nylon-spacer rollers and washers [**Sources**] on bolts through the top holes in the hangers. Snug the nuts just

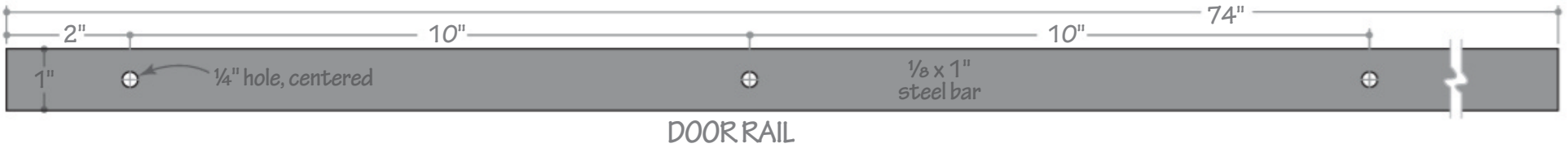
**3 DOOR HARDWARE**




DOOR HANGER

**4 DOOR HANGER DETAIL**




DOOR RAIL

enough to allow the nylon spacer to spin. Cut lengths of steel rod for the door-stop pins, round one end, and epoxy them into the holes in the front trim (M) [Exploded View].

5 Slide the door rollers onto the track, lifting the door enough to engage the pin in the door groove. Press shelf pins into the appropriate holes and lay the movable shelves in place. Finally, place the sideboard wherever you want service with style.

Produced by **Larry Johnston** with **Brian Bergstrom**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| **Carcase** | | | | | | |
| A | sides | ¾" | 16¾" | 25" | OP | 2 |
| B | partitions | ¾" | 16½" | 23½" | OP | 2 |
| C | fixed shelves | ¾" | 16½" | 17⅜" | OP | 2 |
| D | bottom | ¾" | 16½" | 72½" | OP | 1 |
| E | stretchers | ¾" | 3" | 72½" | M | 2 |
| F | back | ¼" | 25" | 73¼" | OP | 1 |
| **Face frame and top** | | | | | | |
| G* | outer stiles | ¾" | 2" | 25" | O | 2 |
| H | inner stiles | ¾" | 2" | 20⅜" | O | 2 |
| I | top rail | ¾" | 3⅛" | 70" | O | 1 |
| J | bottom rail | ¾" | 1½" | 70" | O | 1 |
| K | center rails | ¾" | 1¼" | 15½" | O | 2 |
| L | top | 1" | 19" | 76" | EO | 1 |
| **Base** | | | | | | |
| M* | front trim | ¾" | 2⅛" | 75" | O | 1 |
| N* | side trim | ¾" | 2⅛" | 18⅞" | O | 2 |
| O* | front | ¾" | 3½" | 74" | O | 1 |
| P* | sides | ¾" | 3½" | 18⅜" | O | 2 |
| Q* | front cleat | ¾" | ¾" | 72½" | M | 1 |
| R* | side cleats | ¾" | ¾" | 17⅝" | M | 2 |
| **Shelves and doors** | | | | | | |
| S | movable shelves | ¾" | 15¾" | 36¼" | OP | 2 |
| T | shelf edges | ¾" | 1¼" | 36¼" | O | 2 |
| U | door stiles | ¾" | 2¼" | 22 7/16" | O | 4 |
| V | door rails | ¾" | 2¼" | 15¾" | O | 4 |
| W | door panels | ¼" | 15¾" | 18 11/16" | OP | 2 |
| X* | long crosses | ¼" | 2¼" | 23⅜" | O | 2 |
| Y* | short crosses | ¼" | 2¼" | 10¾" | O | 4 |
| Z* | guide stops | 3/16" | ⅜" | 15/16" | O | 4 |

*Parts initially cut oversize. See the instructions.

**Materials key:** OP-oak plywood, M-maple, O-oak, EO-edge-glued oak.

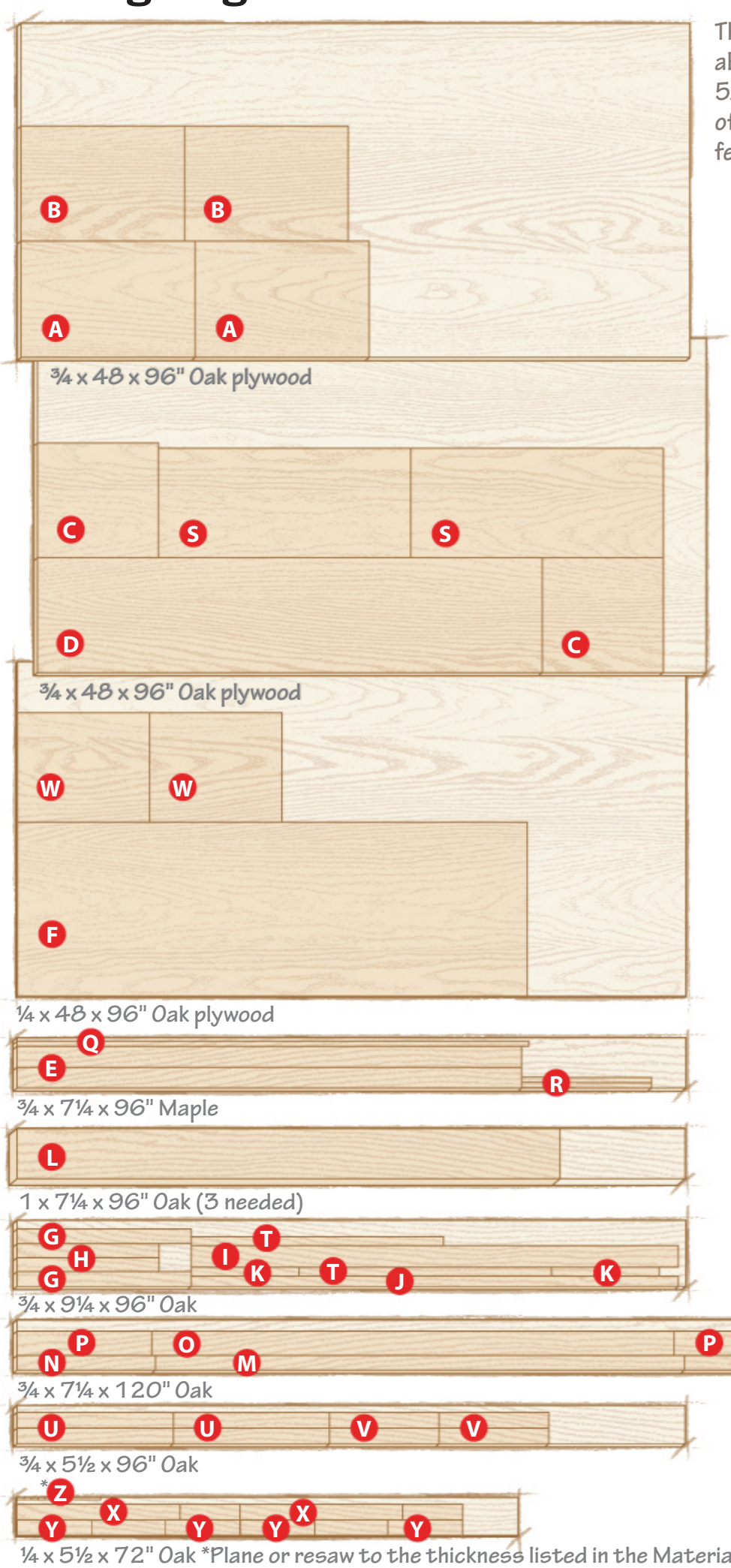
**Supplies:** #20 biscuits, 1¼" pocket screws, #8×1¼" flathead screws, #16×¾" brads, ⅛×1" steel bar, ⅛" steel rod, ⅛" black pipe, ¼" shelf pins.

**Blade and bit:** Dado set; flush-trim router bit.

**Sources:** Birchwood Casey Presto Mag gun blue, $8, woodmagazine.com/gunblue.

¼×⅝" O.D. nylon spacer for ¼" screw, no. 94639A674, pack of 25, $10.45; ¼ ×1" O.D. fender washer, black oxide, no. 92140A112, pack of 10, $6.06; ¼"-20×1" hex bolt, black oxide, no. 94444A103, pack of 25, $8.47; ¼"-20×1¼" hex bolt, black oxide, no., 94444A104, pack of 25, $11.54; ¼"-20×1¾" hex bolt, black oxide, no. 94444A106, pack of 10, $6.62; ¼" washer, black oxide, no. 96765A140, pack of 100, $6.43; ¼"-20 thin lock nut, black oxide finish, no.91581A355, pack of 5, $7.24 (4), McMaster-Carr, (609) 689-3000, mcmaster.com.

## Cutting Diagram




This project calls for about 19 board feet of 5/4 oak, 19 board feet of 4/4 oak, and 5 board feet of 4/4 maple.

*Plane or resaw to the thickness listed in the Materials List.

# Pack & Stack Storage System

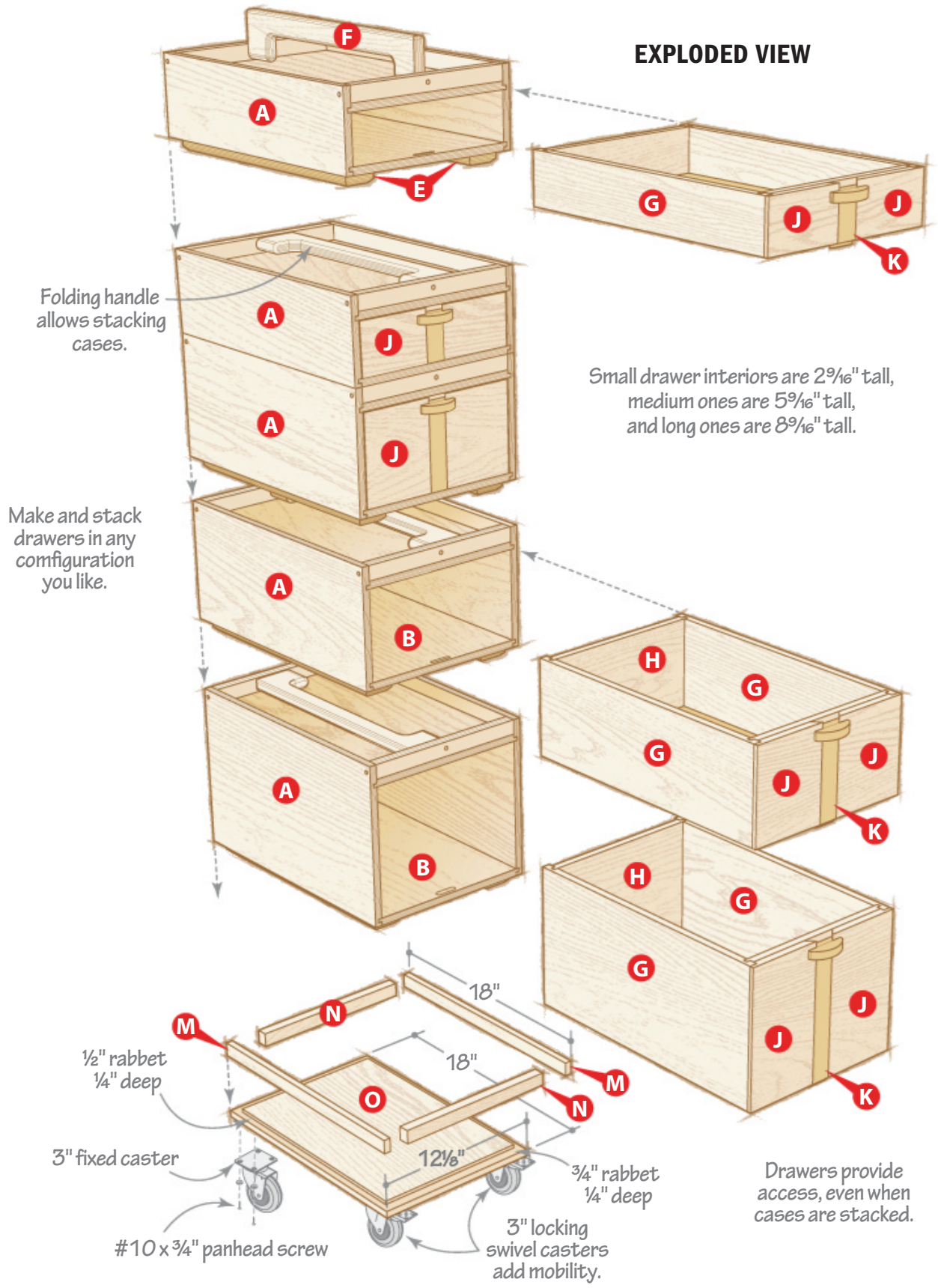
*Mix and match drawer units in a space-saving organizer that really stacks up.*

DIMENSIONS: 12" W × 18" D × up to 48" H

Approximate materials cost: $350

Add about $60 for the 3" casters

Secure cases using a clever combination lock and drawer pull.




Build a set of these boxes customized for your current storage needs, knowing that you can easily expand the set as your tool and accessory collection changes. For example, start with a stack of drawers short enough to tuck under a tablesaw wing. Later, add more to make a mobile storage tower. Each drawer secures with a clever lock that doubles as a drawer pull, so units can become specialty tool boxes to carry where needed.

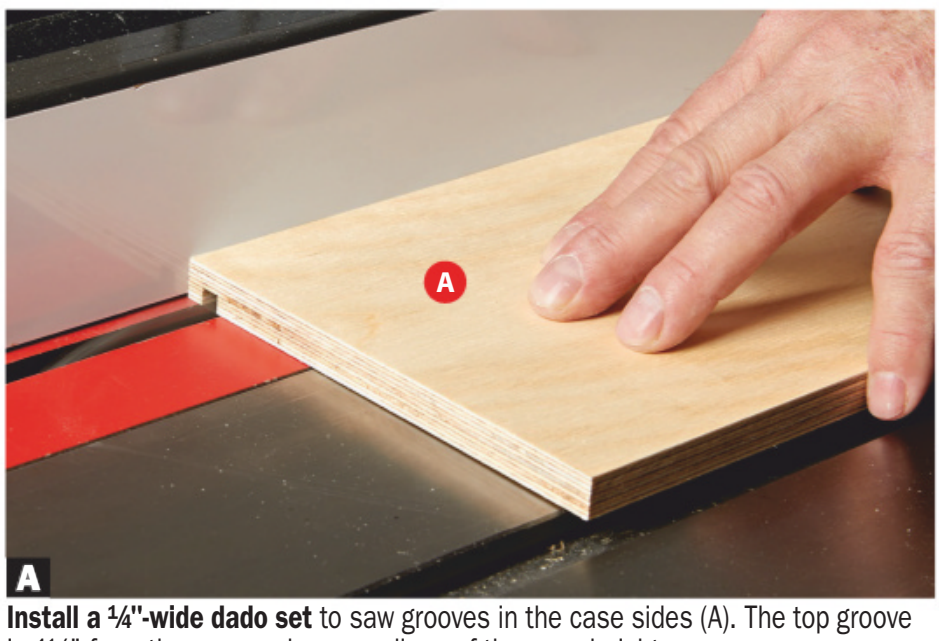
Use the same steps to make small, medium, or large cases and drawers. (Photos show a medium-size version.) Limit a stack to 48" tall for safety and ease of access.

## Set a fast case pace

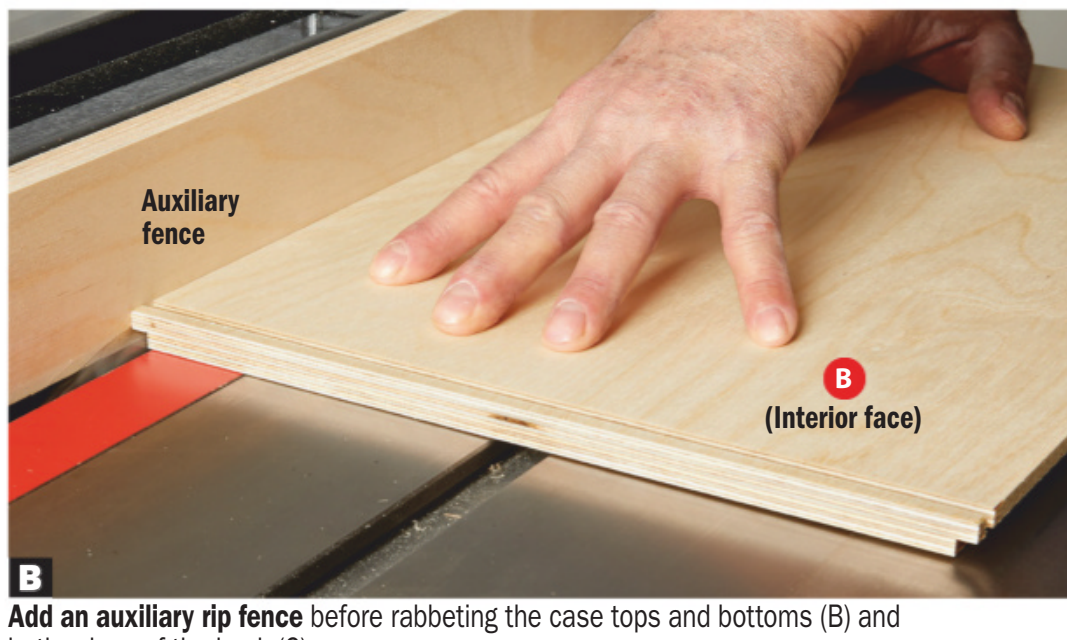
First decide the total number of units you want and in what sizes. Some case and drawer parts are the same regardless of height, so save time by making identical parts and ones with shared dimensions in a single saw or router setup.

1 Cut the case sides (A), top and bottom (B), and back (C) [**Materials List, Drawing 1**]. Groove and rabbet the sides, top, and bottom [**Photos A, B**].

***Note:*** *Baltic-birch plywood varies slightly from the nominal ½" and ¾" thicknesses. Adjust the dado and groove locations to suit actual thicknesses.*

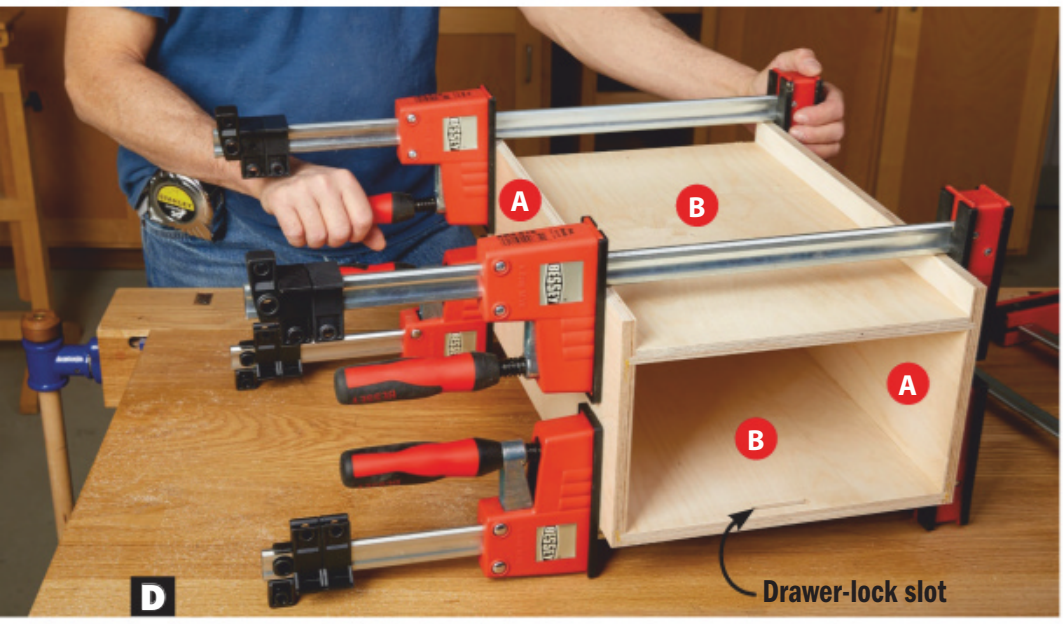



**Install a ¼"-wide dado set** to saw grooves in the case sides (A). The top groove is 1¼" from the upper edge regardless of the case height.




**Add an auxiliary rip fence** before rabbeting the case tops and bottoms (B) and both edges of the back (C).

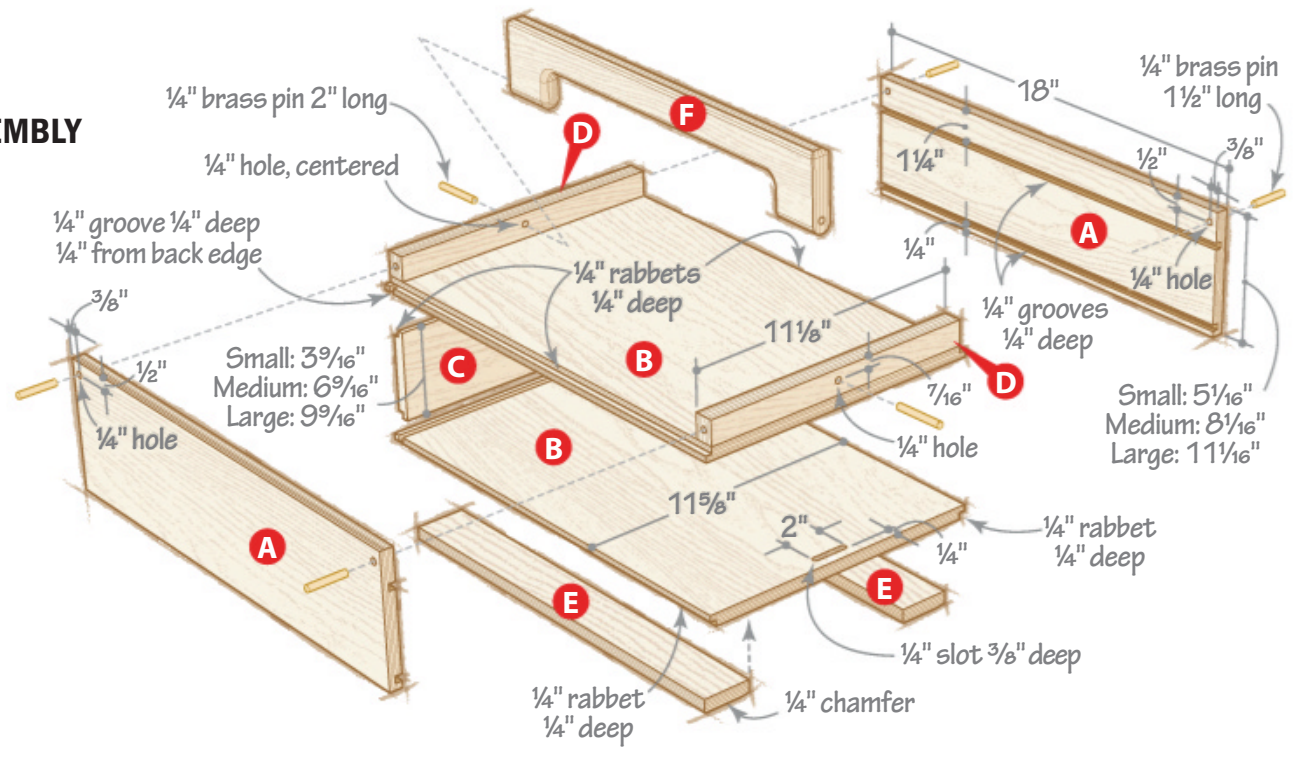

**Plunge-rout a stopped drawer-lock slot** with a ¼" straight bit. If the router lacks an edge guide, clamp a guide to the bottom (B) and ride the base against it.




**Double-check that the drawer-lock slot shows** on the interior of the bottom (B) while assembling the case.


**Drill the holes** 1⅝" deep to drive the pins flush with the surface of the sides (A).

## 1 CASE ASSEMBLY




▶Match the lock front (J) rabbet width to the side (G) plywood thickness.

**2** To accept the drawer lock (K), rout a slot in the bottom [**Drawing 1, Photo C**]. Finish-sand the interior faces of the sides (A), top and bottom (B), and the back (C). Mask off the surfaces to be glued, and finish the inside faces. Then glue up the case [**Photo D**].

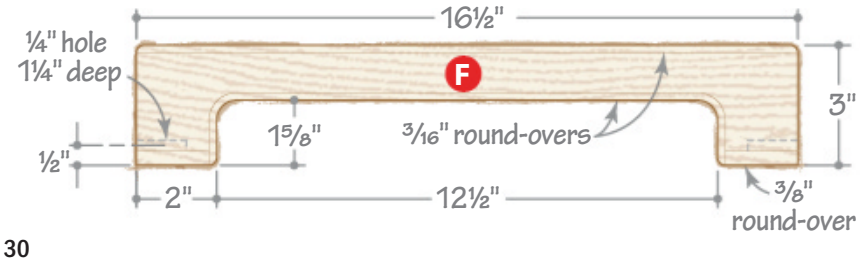
**3** Cut the fences (D) and feet (E) to size. Drill holes in the face of the fences for the handle. Finish-sand and glue the fences and feet in place [**Drawing 1**]. Finish-sand the assembly.

**4** Drill through the sides (A) and into the fences (D) [**Photo E**]. Cut four 1½"-long brass pins [**Sources**]. Polish one end of each pin and secure them in place with cyanoacrylate adhesive.

**5** Chamfer the ends of the case feet (E) and glue them to the case assembly inset ½" on the sides and ¾" from the front edge [**Drawing 1**].

**6** Cut the handle (F) to shape and drill the holes [**Drawing 2**]. Round over the edges and set it aside for finishing.

## 2 CASE HANDLE



## Build matching drawers

Like the cases, drawers come in three sizes but with the same bottoms (I). Save time by cutting all the bottoms in one setup.

1 Cut to size the drawer sides (G), front and back (H), bottom (I), and lock fronts (J).

2 Groove the drawer sides (G), front, and back (H) [**Drawing 3**]. Then dado the drawer sides [**Photo F**] and rabbet the front and back. Drill a 3/32" countersunk pilot hole in the drawer front.

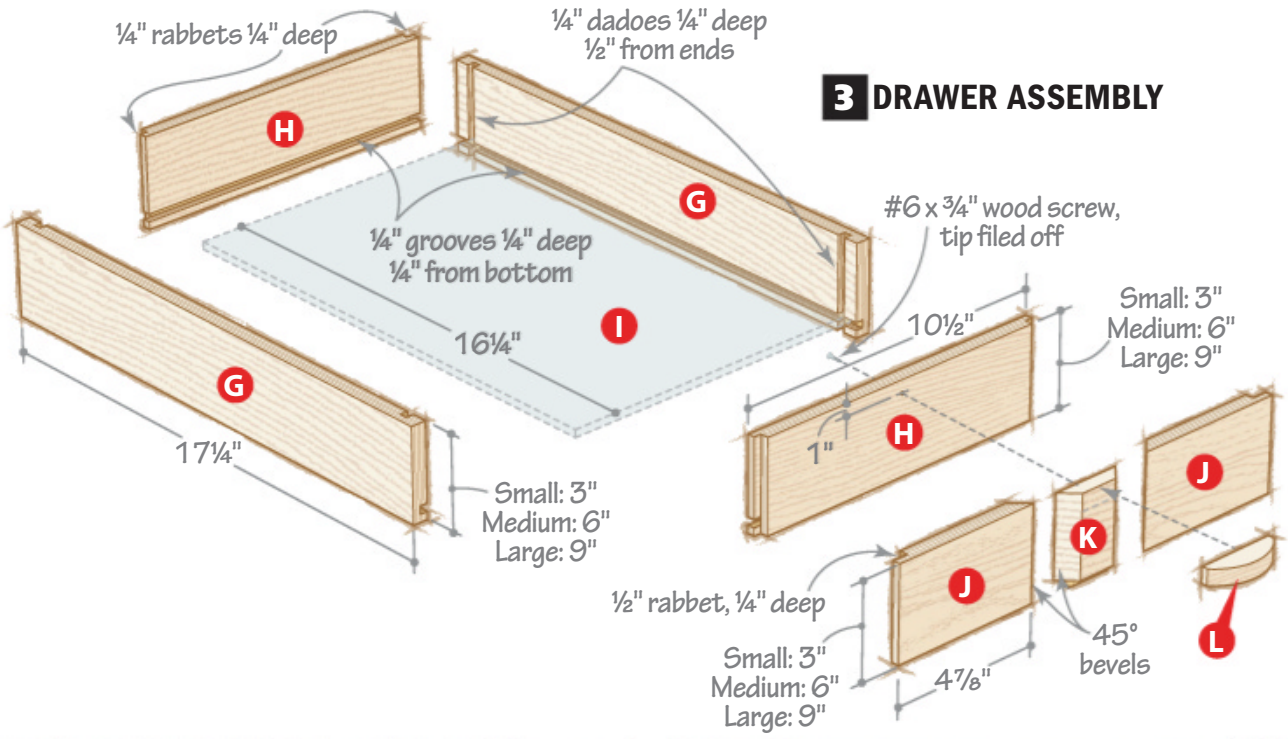
3 Glue and clamp the sides (G) to the front and back (H) and bottom (I) [**Photo G**].

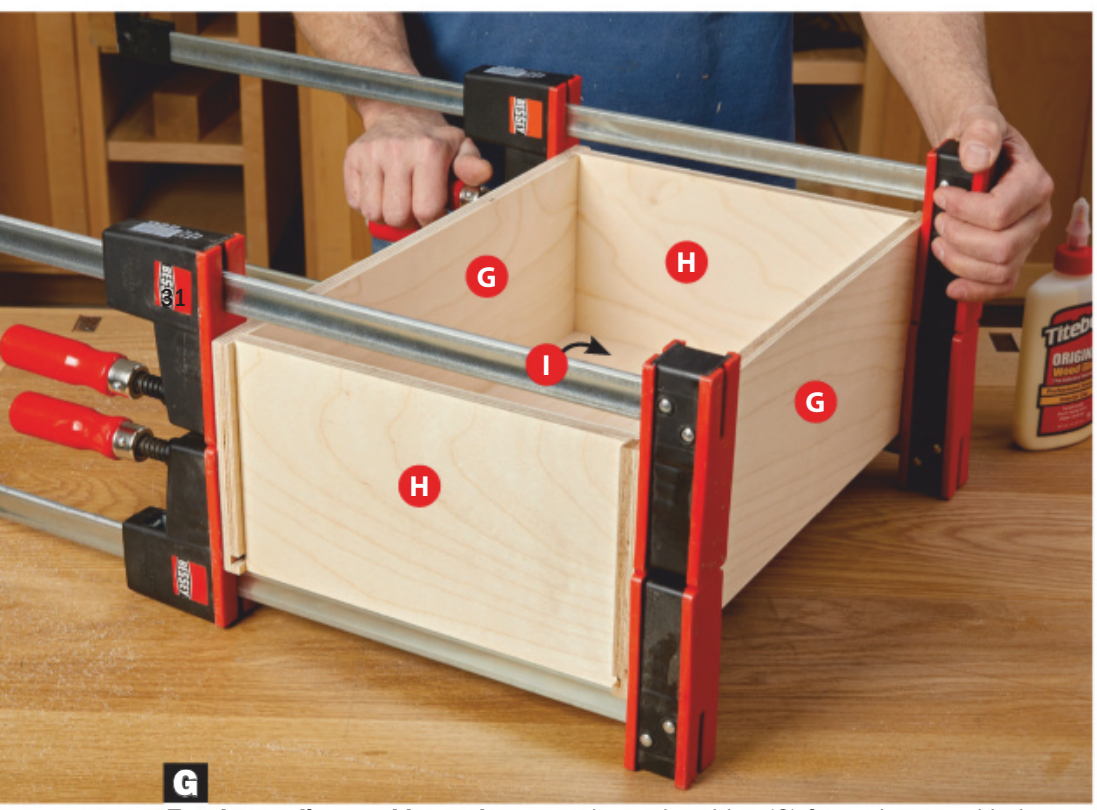
4 Bevel one end of each lock front (J) and rabbet the opposite end [**Drawing 3**].

5 Glue the lock fronts (J) to the drawer front (H) [**Photo H**], taking care to avoid glue squeeze-out along the beveled edges.

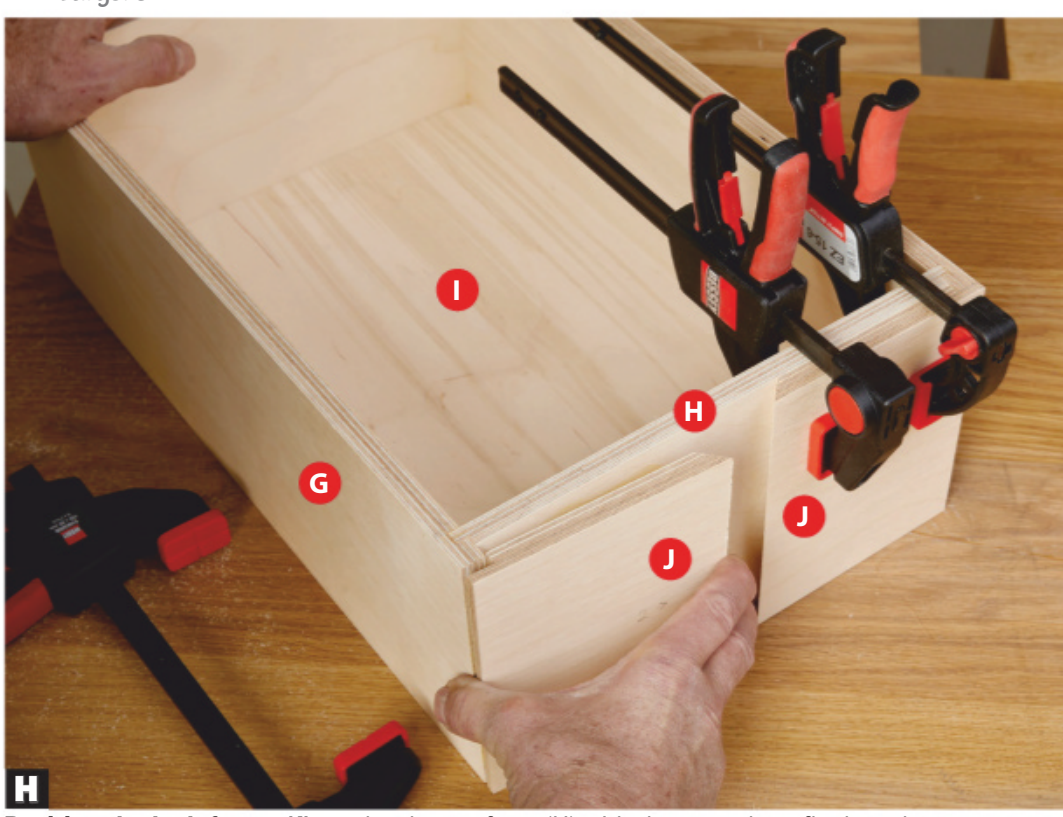
6 Cut the lock (K) ¼" overwidth. Measure the opening between the lock fronts (J) at the widest point, and bevel-rip the lock to width [**Drawing 4**]. Sand and check for a sliding fit between the lock fronts.


**Position the drawer side (G)** using the rip fence, but move the workpiece safely using a miter gauge.




**For the medium and large drawers,** clamp the sides (G) from above and below to ensure a square assembly.




**Position the lock fronts (J)** on the drawer front (H) with the top edges flush and the rabbets snug against the drawer sides (G).

▶Watch a project overview with details on how to assemble the drawer lock. woodmagazine.com/storagestack

7 Rabbet one end of the lock (K) [**Photo I**] and drill where shown. Cut and shape the pull (L) [**Drawing 5**], then glue it to the lock.

## Rolling to the finish

1 Cut the base trim (M, N) and plate (O) to size. Rabbet the top edges of the plate [**Exploded View**]. Glue the trim to the plate.

2 Apply a clear finish to all assemblies. (We used a catalyzed varnish.)

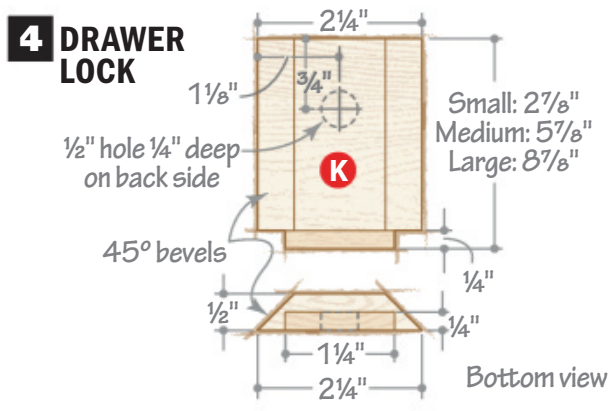
3 Screw fixed casters [**Sources**] to the rear of the base assembly and swivel casters at the front.

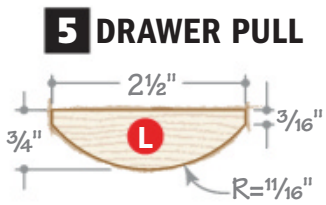
4 Cut two 2"-long brass pins and start them in the holes in the fences (D). Insert cyanoacrylate adhesive into the handle (F) holes. Drive the pins into the handle and ensure that it pivots freely.

5 Drive a screw through the inside of the drawer front (H) to thread the pilot hole [**Drawing 3**]. Remove the screw and file ⅛" off the tip. Insert the lock (K) between the lock fronts (J), and reinsert the screw to limit the lock's travel.

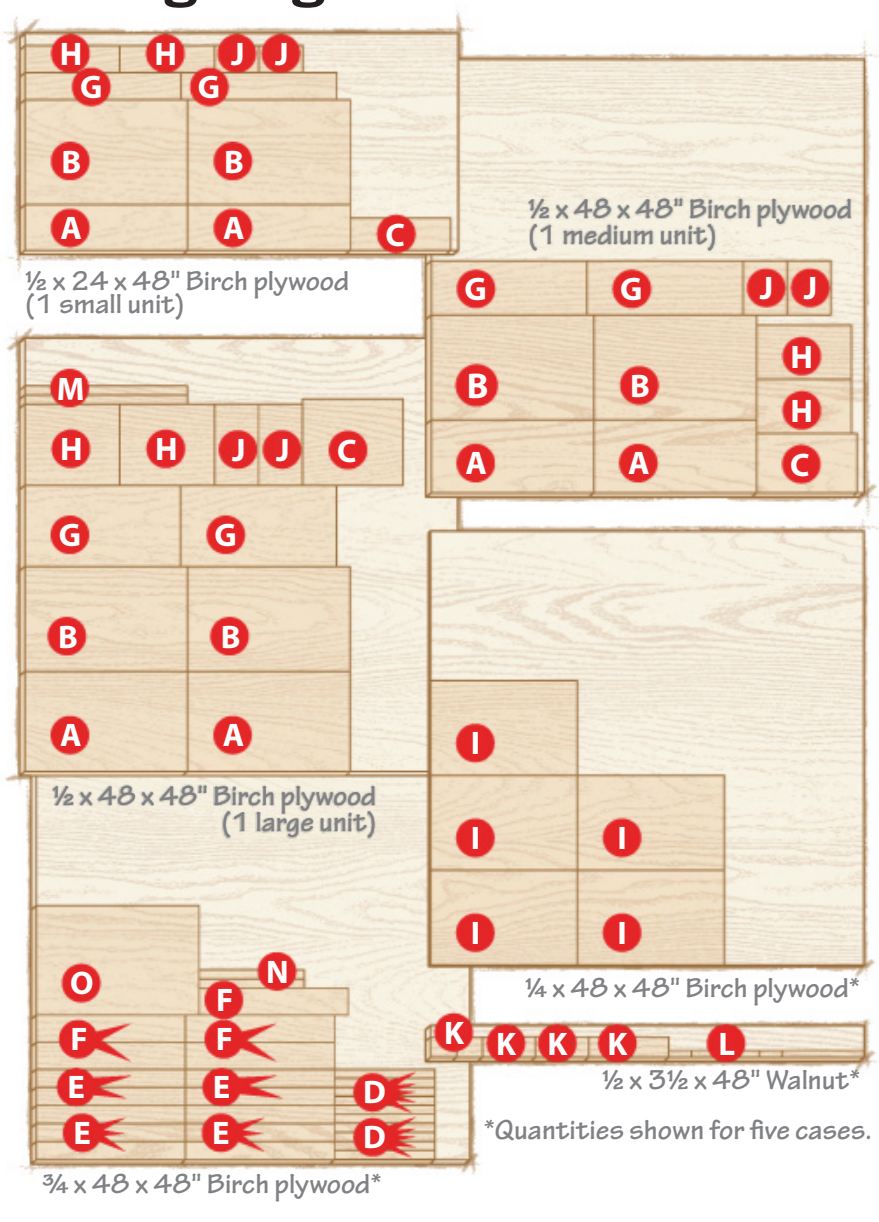
6 Pack and stack the drawer cases on the base, keeping heavy contents as low as possible. Your shop-organizing efforts are on a roll.


**After rabbeting the drawer lock (K),** as shown here, stand the workpiece on edge to remove the miters flanking the rabbet. Check that the tenon fits the drawer-lock slot in the case bottom (B).




## Cutting Diagram




## Materials List

| Part | | FINISHED SIZE SMALL T | W | L | FINISHED SIZE MEDIUM T | W | L | FINISHED SIZE LARGE T | W | L | Matl. | Qty.† |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Case** | | | | | | | | | | | | |
| A | sides | ½" | 5 1/16" | 18" | ½" | 8 1/16" | 18" | ½" | 11 1/16" | 18" | BP | 2 |
| B | top/bottom | ½" | 11⅝" | 18" | ½" | 11⅝" | 18" | ½" | 11⅝" | 18" | BP | 2 |
| C | back | ½" | 3 9/16" | 11⅛" | ½" | 6 9/16" | 11⅛" | ½" | 9 9/16" | 11⅛" | BP | 1 |
| D | fences | ¾" | 1" | 11⅛" | ¾" | 1" | 11⅛" | ¾" | 1" | 11⅛" | BP | 2 |
| E | feet | ¾" | 2" | 16½" | ¾" | 2" | 16½" | ¾" | 2" | 16½" | BP | 2 |
| F | handle | ¾" | 3" | 16½" | ¾" | 3" | 16½" | ¾" | 3" | 16½" | BP | 1 |
| **Drawer** | | | | | | | | | | | | |
| G | sides | ½" | 3" | 17¼" | ½" | 6" | 17¼" | ½" | 9" | 17¼" | BP | 2 |
| H | front/back | ½" | 3" | 10½" | ½" | 6" | 10½" | ½" | 9" | 10½" | BP | 2 |
| I | bottom | ¼" | 10½" | 16¼" | ¼" | 10½" | 16¼" | ¼" | 10½" | 16¼" | BP | 1 |
| J | lock fronts | ½" | 3" | 4⅞" | ½" | 6" | 4⅞" | ½" | 9" | 4⅞" | BP | 2 |
| K* | lock | ½" | 2¼" | 2⅞" | ½" | 2¼" | 5⅞" | ½" | 2¼" | 8⅞" | W | 1 |
| L | pull | ½" | ¾" | 2½" | ½" | ¾" | 2½" | ½" | ¾" | 2½" | W | 1 |

| Part | | T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| **Base** | | | | | | |
| M | trim sides | ½" | 1" | 18" | BP | 2 |
| N | trim front/back | ¾" | 1" | 11⅛" | BP | 2 |
| O | plate | ¾" | 12⅛" | 18" | BP | 1 |

†Quantities are for one case or drawer. Multiply by the number of cases and drawers of each size.
*Part initially cut oversize. See the instructions.

**Materials key:** BP-Baltic-birch plywood, W-walnut

**Supplies:** #6×¾" flathead screws, #10×¾" panhead screws.

**Blade and bits:** Dado set; 3/16" round-over, ⅜" round-over, and ¼" straight router bits.

**Sources:** ¼×36" brass rod, no. 8970K52, $9.64, McMaster-Carr, 562-692-5911, mcmaster.com. 3" polyurethane fixed casters, no. 00K2130, $10.10 (2) and 3" polyurethane locking swivel casters, no. 00K2131, $16.10 (2), Lee Valley, 800-871-8158, leevalley.com.

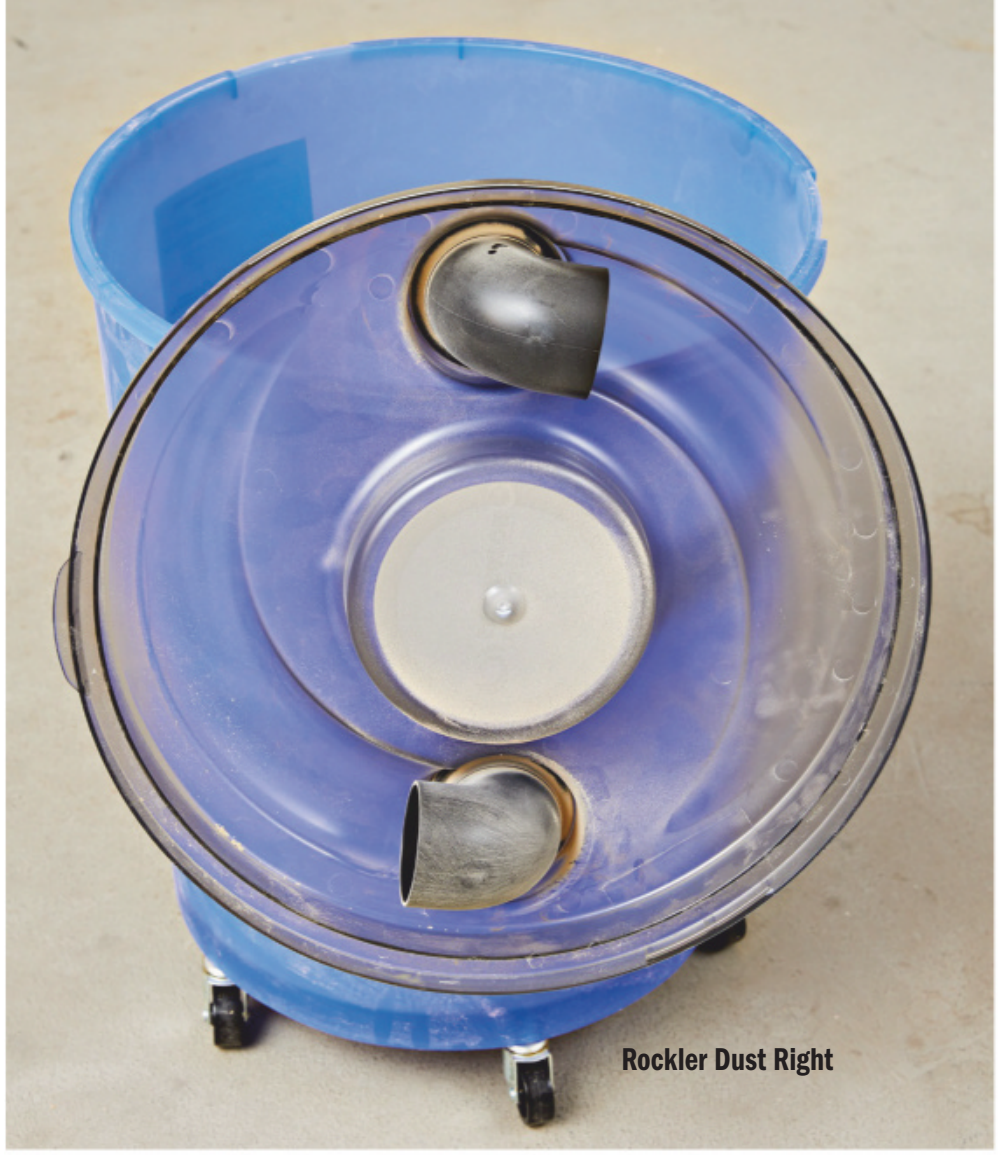
Produced by **Robert Wilson** with **Brian Bergstrom**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

# The Lowdown On Dust Separators

*These inline containers make your shop vacuum or dust collector work more efficiently.*

Oneida 4" Super Dust Deputy deluxe cyclone kit

Two-stage cyclone-style dust collectors work better (and cost more) than single-stage machines because their cone-shaped cylinders disrupt airflow, causing heavier debris to fall out before it gets to the filter. Fewer chips in the filter means improved filtration and efficiency. But you can upgrade your system affordably with an inline dust separator to provide the same benefit at a lower cost. Before you buy a separator, here's what you need to know.




**Channels in this separator's low-profile lid direct air into a spiral motion** within the bucket or bin, slowing the air's speed so debris settles out. Either port on this unit can serve as the inlet or outlet with no performance difference.


**The steeper spirals on a cyclone separator slow airflow quicker** than the more passive low-profile lid models. Debris falls out of the airstream sooner and more efficiently, dropping into the collection drum or bin.

## How a separator works

Like a cyclone collector, a separator connected between a dust collector or vacuum and a dust-making machine forces heavier chips and dust particles to drop out of the airflow. Lighter particles remain airborne and continue on to the collector or vac for collection and filtration.

Separators come in two styles: cone-shapes that separate primarily above the collection bin, and low-profile lids that separate within the collection bin. Both attach to a bucket or drum, which may or may not come with the separator. Cone separators cost $50–$550, and have inlet/outlet ports from 2" to 6" in diameter. The lid models cost $25–$80, and have 2–4" ports. Match


**This low-profile-style separator proves effective** and affordable, mounting simply to a common 5-gallon bucket.


**Look for a separator with a foam-rubber or soft-rubber gasket** that seals the lid against air leaks, ensuring maximum suction. These can be replaced as they wear over time.

**Tip!** *To maximize airflow, use as few 90° elbows and similar airflow-restricting connections as possible.*

the inlet/outlet sizes to your vacuum or collector hose for best results.

The low-profile-type units rely on the air space inside the collection bin to create the separation action. So, as the bin fills, it becomes less effective at separating the dust. To maintain efficient separation, dump the bin before it reaches ¾ full. Cyclone separators can go longer between dumpings because all separation occurs above the collection bin.

Because the bulk of debris never reaches the collector's small collection/filter bag, an affordable 4" portable collector, such as the 1-hp unit shown on *page 33*, operates more efficiently than it would without the separator. However, adding a separator can reduce a collector or vacuum's overall airflow, so keep flex hose lengths as short as possible to minimize this.

You'll get the best results when you use a separator of appropriate size for your vacuum or dust collector. Using a small separator with a large 3-hp dust collector could overpower the separator, pulling large debris right through it or collapse it. Likewise, a shop vacuum will struggle to pull enough dust-laden air through a large separator with a 4" or larger port.

## Bin there, done that

The collection bin for your separator can be as simple as a 5-gallon plastic bucket or as fancy as a steel drum. Smaller bins fill faster, but handle easier for dumping, so decide which is more important: frequency or convenience.

Garbage cans aren't designed or built to precise standards, so the can-topper separator lid you buy might not fit or seal well on your existing can. We were unable to find perfect garbage-can matches for two common lid separators, so buy at your own risk.

We like steel collection drums for their durability, but they're costly and can be heavy to dump. For these, we recommend using disposable liner bags that lift out easily. Rigid plastic drums (larger than a bucket) also work well, and generally prove light enough to lift and dump. Fiber drums, because of their lighter weight, are easiest to lift and dump, and store a good amount of debris. But a drum with walls too thin can potentially collapse under the suction of a powerful vacuum or dust collector.

With any solid-material bin, we suggest you cut a small view window near the top and attach a piece of clear acrylic or glass. This lets you see when the bin needs to be dumped. A separator doubles the footprint of your collector or vac, unless you get creative, as shown *above right*.

Produced by **Bob Hunter**


**Oneida Dust Deputy deluxe cyclone kit**

▶Get plans to build a vac-and-separator stand.
woodmagazine.com/vacseparatorstand

**Minimize a unit's footprint by stacking** the separator and vacuum in a shop-made stand designed to fit your components. Ideally, put the vacuum above the separator to minimize hose lengths and restrictions.

**Sources:**

Dustopper separator kit, no. HD12, $35, Home Depot, homedepot.com.
Dust Right dust separator, no. 45556, $80, Rockler, 800-279-4441, rockler.com.
Dust Deputy deluxe cyclone separator kit, no. AXD000004A, $99.95, Oneida Air Systems, 800-732-4065, oneida-air.com.
Super Dust Deputy 4" deluxe cyclone separator kit, no. AXD002040A, $219.95, Oneida Air Systems.
Super Dust Deputy 5" cyclone, no. AXD002030A, $169.95, Oneida Air Systems.

▶Build your own dust-collection separator from our plans.
woodmagazine.com/separatorstand

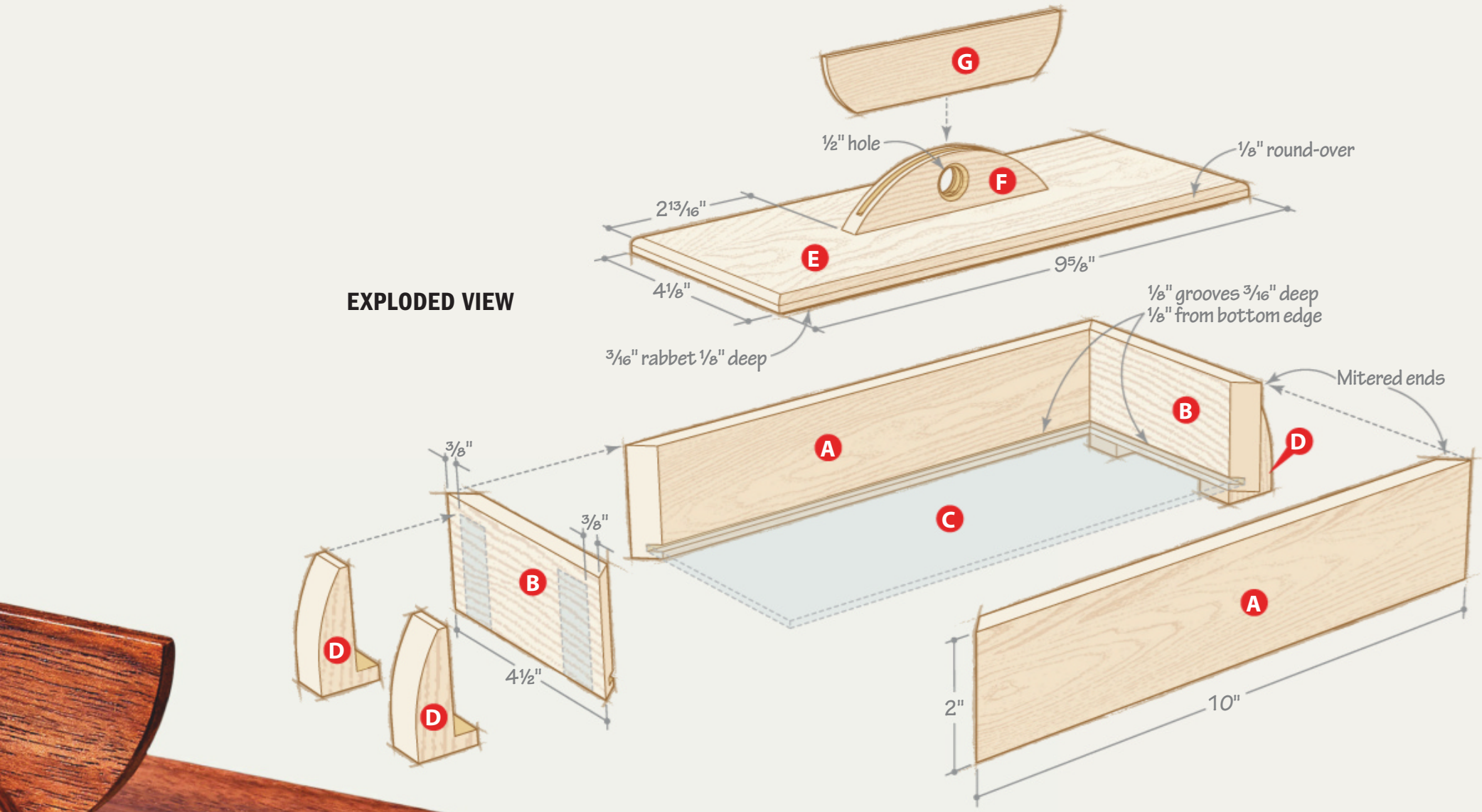
# Decorative Keepsake Box

*Lacewood contrasts with walnut on a long, low box you can build in a weekend.*

**DIMENSIONS:**
4½" W × 11¼" D × 3¾" H

**Approximate materials cost:**
**$0**
if you raid your scrap stash

**Should hold**
**$35K**
in $100 billls (estimated)




**EXPLODED VIEW**

▶ *Chatoyance*: The color-changing property of wood depending on how light reflects off the grain.

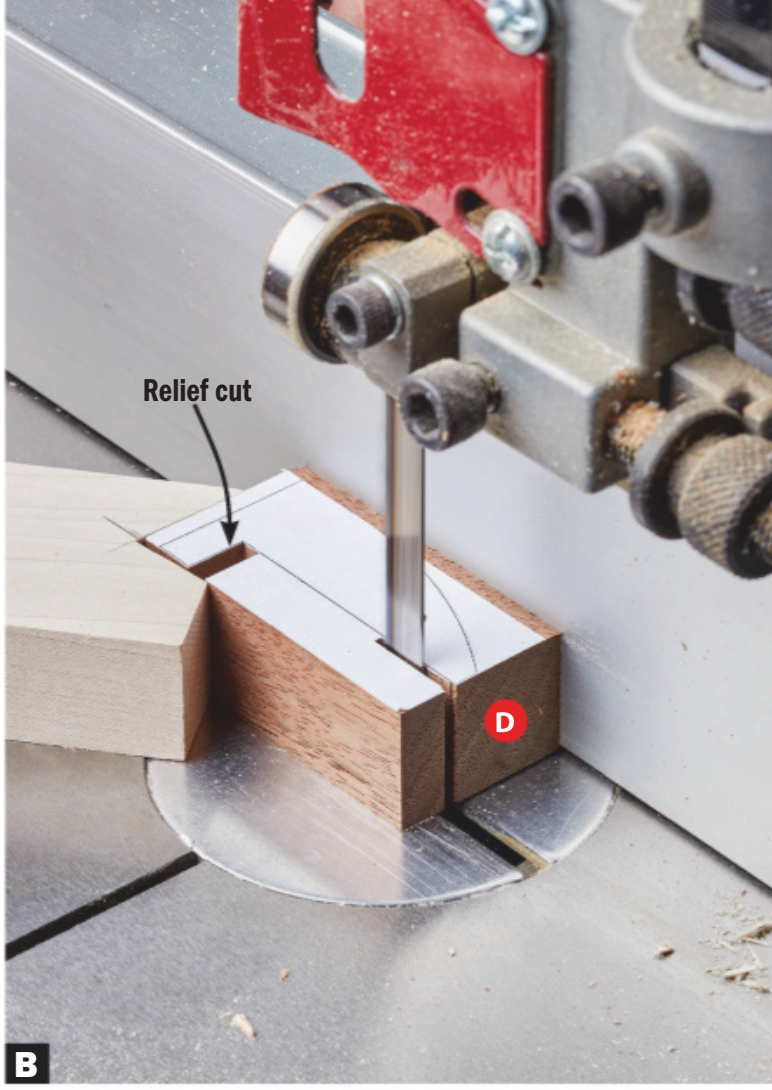
Small boxes make perfect projects for those too-beautiful-to-toss scraps. For the sides and ends of this box, we used a long-saved cutoff of lacewood, a species with chatoyant grain that shows an almost three-dimensional depth. The walnut feet and lid stand out against the lighter box. A handle combining both woods tops it off.

## Build the box

1 Cut the sides (A) and ends (B) to width and slightly longer than listed [**Materials List**]. Bevel-cut the ends to bring the pieces to finished length [**Exploded View**]. Cut the grooves to accept the bottom (C).

2 Finish-sand the inside faces. Cut the bottom (C) to size, dry-fit the box, and adjust the bottom's fit, if necessary.


**Wrap the taped sides and ends (A, B)** around the bottom (C), then close the last corner with another strip of tape.




**Cut a birdsmouth notch in a scrap** to create a pushstick that moves the foot (D) forward while pressing it against the bandsaw fence.

3 Align the sides and ends (A, B) end to end, outside face up, and apply painter's tape across the three joints. Flip the assembly over, brush glue onto the miters and grooves, and assemble the box [**Photo A**].

## Fabricate feet

▶Get tips on applying patterns to workpieces. woodmagazine.com/stickysolutions

1 Apply a copy of the **Foot Patterns** to the face of a ¾×1×12" blank. Make a relief cut with a pass over a tablesaw blade to define the shoulder of the notch in each foot. Cut the feet (D) to length and bandsaw the notch [**Photos B** and **C**].

2 Bandsaw and sand the curve on each foot, maintaining a crisp edge on the curved face.

3 Remove the patterns, finish-sand the feet, and glue them to the box [**Exploded View**], clamping from one end of the box to the other.

## Handcraft a lid and handle

1 Cut the lid (E) to size [**Exploded View**], round over the top face, and rabbet the bottom face. The lid should fit just a touch loose in the box opening. Finish-sand the lid.


**Apply self-adhesive sandpaper** to a flat scrap and sand the notches smooth.

**2** Apply a copy of the **Handle Base Pattern** to a ⅜×1×10" blank. Drill the hole, then rip a centered groove [**Photo D**].

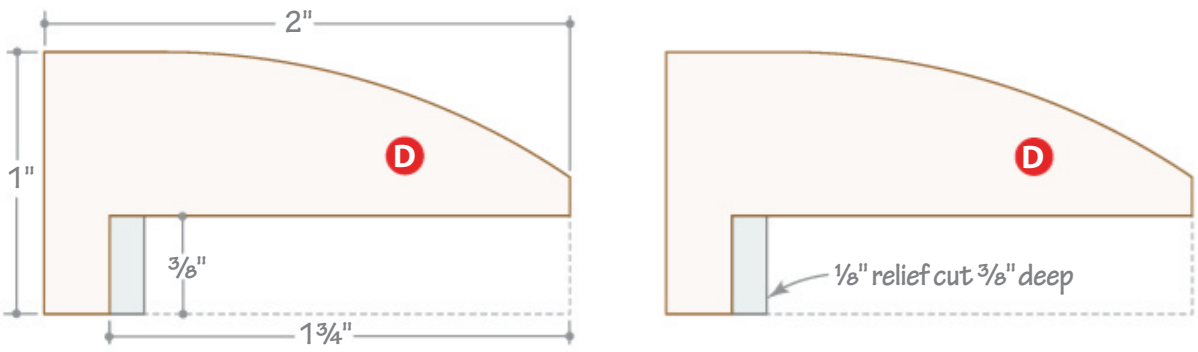
**3** Bandsaw and sand the handle base (F) to shape. Remove the pattern and round over the hole on both faces.

**4** Plane a blank to fit the groove in the handle base (F) and apply the **Handle Pattern** to it. Cut and sand to the lines, then remove the pattern. Finish-sand the handle base (F) and handle (G), then glue the handle into the base.

**5** After the glue dries, glue the handle (F/G) to the lid, centered. Apply a finish. (We sprayed on aerosol satin-finish lacquer.)

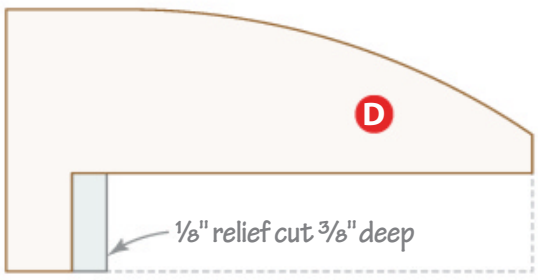

**Make test cuts on scrap** to center the blade on the handle blank. Set the blade height so the groove depth extends just above the hole in the blank.

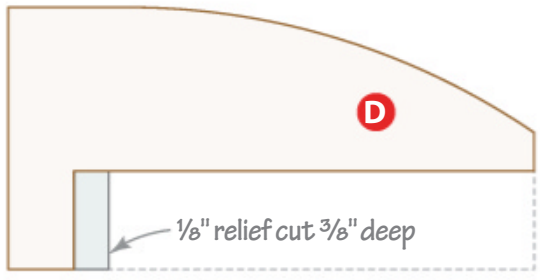
## 1 FULL-SIZE PATTERNS

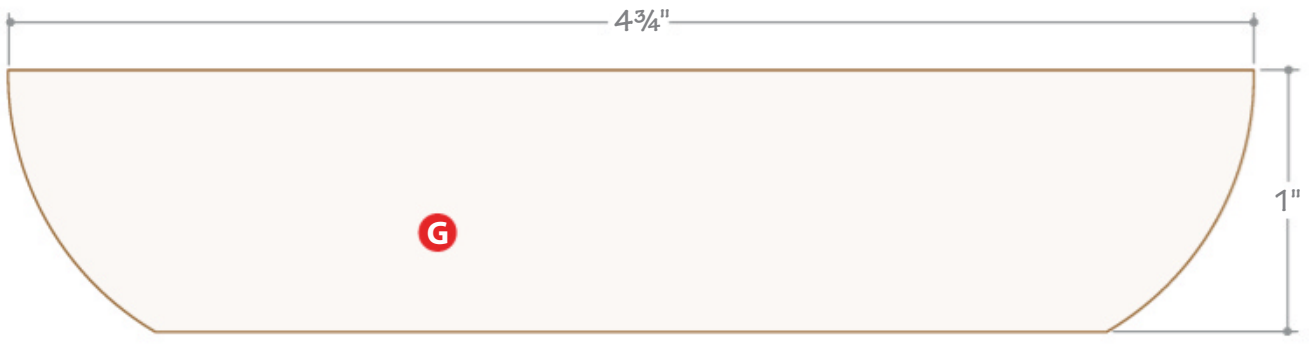



FOOT PATTERNS

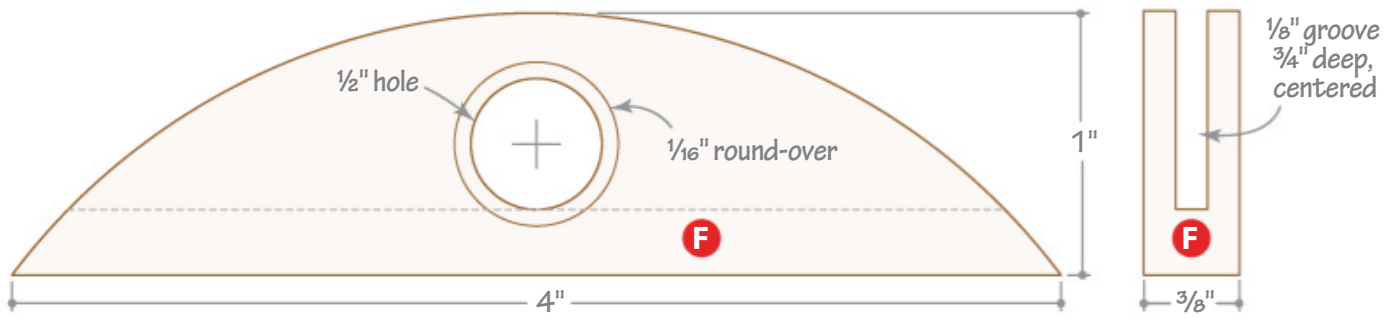



HANDLE PATTERN




HANDLE BASE PATTERN

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| A* | sides | ⅜" | 2" | 10" | L | 2 |
| B* | ends | ⅜" | 2" | 4½" | L | 2 |
| C | bottom | ⅛" | 4⅛" | 9⅝" | Ply | 1 |
| D* | feet | ¾" | 1" | 2" | W | 4 |
| E | lid | ⅜" | 4⅛ | 9⅝" | W | 1 |
| F* | handle base | ⅜" | 1" | 4" | L | 1 |
| G | handle | ⅛" | 1" | 4¾" | W | 1 |

*Parts initially cut oversize. See the instructions.

**Materials key:** L-lacewood, Ply-birch plywood, W-walnut.
**Bits:** ⅛" and 1/16" round-over router bits.

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

SHOP TEST

# Mid-Range

# Tablesaws

*With more muscle and stability than a benchtop model and no need for 220-volt power, one of these in-between machines may be perfect for your shop.*

### How we chose the field

In order to be included in our test group, each tablesaw had to meet the following criteria:

- Designed to stand on its own legs or cabinet
- Prewired for 110 volts (some models can be rewired for 220-volt service)
- Cast-iron table (cast-iron extensions are a bonus)
- Approximately 30–36" of rip capacity.

▶Read our tips for assembling and setting up a tablesaw. woodmagazine.com/setupsaw

Not every woodworker needs (or can afford) a powerful, feature-packed cabinet-style tablesaw with a 3-hp or larger motor. But we all need a machine with enough moxie to rip thick hardwoods without stalling, cut sheet goods without wobble and worry, and do all that with precision. The saws in this test all measure up to those standards thanks to motors rated at 1½ hp or more, heavy-duty tabletops and built-in stands, and beefy rip fences. But that's not to say they're all equal. Our tests reveal differences you won't read about in their online specs.

## Six key features tell a tablesaw's worth

■ **Cutting clout.** In our testing, each saw proved capable of ripping 1¾"-thick red oak—using a new rip blade—without stalling, overloading, or tripping a breaker. You can cut stock faster than on a benchtop/jobsite saw, but you'll have to feed stock slower than you might on a more powerful saw.

■ **A reliable rip fence.** The best fences glide easily along their rails and lock solidly. Seven of the saws come with a T-square-style fence, which locks only at the operator end of the saw and can deflect slightly as you apply side-

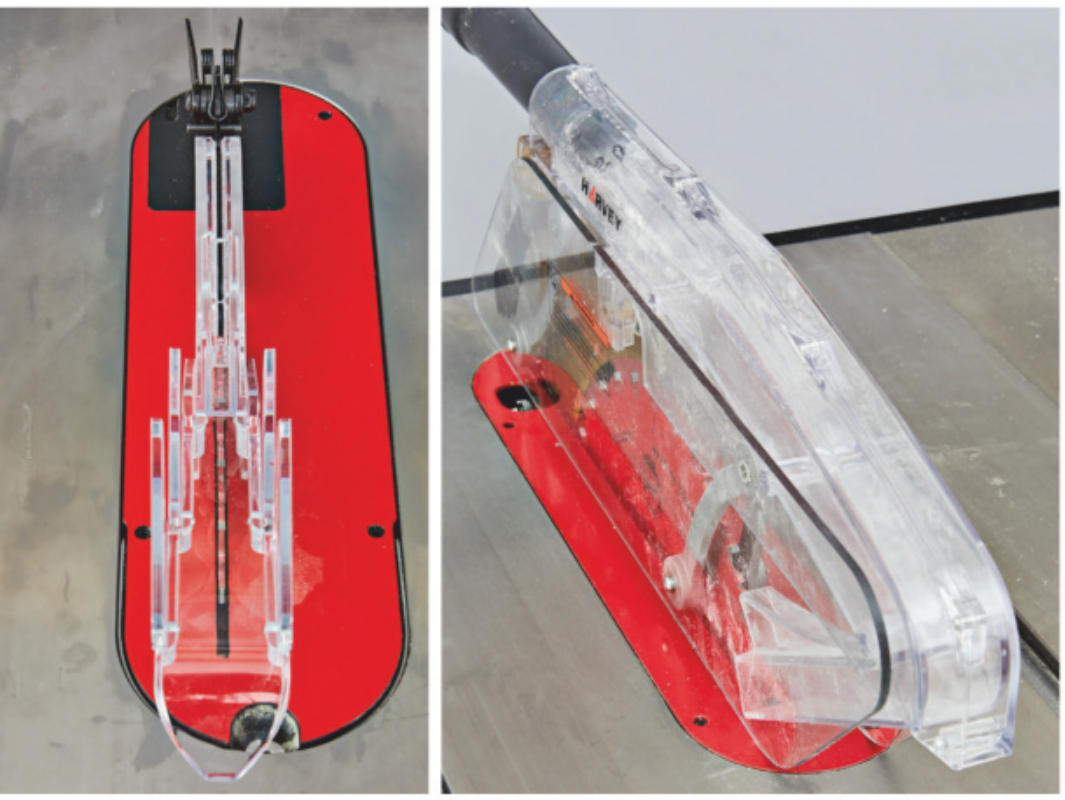
**The Powermatic's intuitive increments** and wide, clear bezel with hairline cursor make it easy to quickly and accurately set a precise rip width.


**Rikon's rip-fence scale increments** are similar in length, making them difficult to distinguish, especially with the narrow view window and thick cursor.


**Ridgid's auxiliary rip fence can be positioned** on either side, allowing you to get better support under the blade guard on narrow and thin rips.

▶Learn how to improve the fit of a miter gauge without a built-in adjuster. woodmagazine.com/mitergaugetuneup. Or upgrade to an aftermarket miter gauge. woodmagazine.com/mgreview

ways force during a ripcut. However, in our tests, none of these fences deflected more than .011"—an amount virtually undetectable as an end result in wood. The fences on the other four saws (Delta 36-725T2, Ridgid R4512, Rikon 10-205, and SawStop CNS175-SFA30) lock at both ends, eliminating even the possibility of deflection. We had no issues with the accuracy of any of the rip-fence scales that indicate cutting width, but we found those on the Ridgid and Rikon more difficult to read reliably (photos, *above*).



**The minimal size and clear view window** on the SawStop PCS175 blade guard (*left*) provides great visibility for making both ripcuts and crosscuts. The Harvey's vacuum-enabled guard (*right*) effectively captures the plume of dust spraying off the blade, but obstructs your view of the blade when lining up crosscuts.

■ **An accurate miter gauge.** The miter gauges that come with these saws are functional, if not fancy, most with angle stops at only 90° and 45° (although not all are adjustable). The Delta, Grizzly G0771Z, and Shop Fox W1837 step up the game with nine adjustable stops. The Powermatic PM1000's miter gauge also includes a fence with flip-stop, but we found too much play in the 90° and 45° stops to be confident in the accuracy.

■ **A user-friendly blade guard.** Unlike the antiquated blade guard on your daddy's tablesaw that got sidelined because it got in the way more than it helped, the guard, splitters, and antikickback pawls of modern guards remove—and, more importantly, reinstall—easily. Some models even come with a separate riving knife that you can swap with the splitter for non-through cuts or narrow rips. The splitters (and riving knives) on the tested saws work well with full-kerf (⅛"-thick) blades, but may cause workpiece binding if used with a thin-kerf blade. (Powermatic offers an optional thin-kerf riving knife.)

■ **Efficient dust collection.** All of the saws shroud the lower half of the blade with a dust hood to capture debris as it comes off the blade (when attached to a vacuum or dust collector). Dust ports on most of the tested saws' enclosed cabinets also help evacuate dust that escapes the blade shroud.

▶**Definitions**

*Trunnions*: The brackets that hold the motor and blade-arbor assembly in place and allow them to tilt. *Trunnions mounted to the cabinet* make it easier to align the miter slots with the blade because you simply loosen the top and rotate it slightly. With *trunnions mounted to the top* itself, you have to reach inside the cabinet and loosen the trunnions to align the blade to the miter slots—a more difficult process.

***Tip!*** *If you must regularly remove your dust-collection hose from a saw with a difficult-to-reach bottom-mounted port, simply attach an elbow to the port permanently. Then install and remove the flex hose as needed from the elbow.*

18+

# WHAT IS AVAXHOME?

# AVAXHOME-

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**SawStop's standard throat plate** is made of durable ⅜"-thick phenolic, with a lever-lock clamp and narrow blade slot.


**The shallow, narrow ledge in the cast-iron top** on four saws (Grizzly shown here) makes it difficult to create your own plywood zero-clearance inserts.

▶Learn how to make your own zero-clearance throat insert plates. woodmagazine.com/zeroinsert. Or buy precut phenolic plates ($30–$50 each) at leecraftzeroclearance.com.

In addition, blade-guard-mounted dust ports on the Harvey and Laguna saws effectively capture dust from above the blade.

■ **Throat insert versatility.** Each saw comes with a throat insert plate to tighten the gap around the blade, but only the Grizzly, Harvey, and Shop Fox saws also include a wide-opening insert for use with a dado set. We like the SawStop plates (shown *above*) best because they have a lever lock and the 3⁄16"-wide blade slot works, essentially, as a zero-clearance plate. Most saws offer dado and/or zero-clearance plates as optional accessories. The ⅛"-thick steel plates (shown *above right*) on the Grizzly, Harvey, Rikon, and Shop Fox saws were not flat out of the box. We were able to flatten all but the Harvey, which has stamped reinforcing ribs running the length of it that prevented flattening.

***Note:*** *Never freehand-cut a workpiece on a tablesaw! Always register the workpiece against the rip fence or miter gauge (but not both when making a through-cut), or a jig.*

# Here's how we see these saws

2020 WOOD® Magazine TOP VALUE Mid-Range Tablesaw


## Delta 36-725T2
## $600

**864-231-5888, deltamachinery.com**

■ **Rip fence:** We could not get both of the aluminum faces perpendicular to the tabletop. When we calibrated one, the other moved out of square. But since we rarely use the right fence face, we set the left one square and lived with the right being off. A flip-down auxiliary fence extends under the blade guard to assist with narrow or thin ripcuts—but it works only with the fence on the left side of the blade.

■ **Miter gauge:** With nine positive stops—all adjustable—and two T-slot washers, this is one of the better miter gauges in the test. Setscrews on the bar let you snug up the fit in the miter slots, but ours needed frequent readjusting.

■ **Blade guard/splitter/riving knife:** The blade guard and antikickback pawls remove easily from the splitter, which then can be lowered to serve as a riving knife.

■ **Dust collection:** The 2½" dust port should connect easily to most shop vacuums. With an open cabinet bottom, any dust that escapes the plastic-and-fabric shroud around the blade simply falls to the floor.

■ **Also worth noting:** You can adjust the blade-tilt stops easily via setscrews in the cast-iron top. We found the power switch difficult to locate without looking. Two fixed casters and a single swiveling caster make this saw easily maneuverable. All the included accessories store easily on the saw.


## Grizzly G0771Z
## $925

**800-523-4777, grizzly.com**

■ **Rip fence:** T-slots on the aluminum fence faces are great for accessorizing with jigs and featherboards, but access to them is blocked on the ends by plastic caps. You'll need to remove these caps to use the slots, which exposes sharp edges on the ends of the aluminum extrusion. The faces could not both be made perpendicular to the tabletop, so we squared the left face because we use it almost exclusively.

■ **Miter gauge:** It's nearly identical to the Delta's, but with a single T-slot washer at the end of the bar.

■ **Blade guard/splitter/riving knife:** The blade guard can be removed, but the antikickback pawls mount permanently to the splitter, so when you don't want to use them, you'll have to remove the splitter. When ripping 1½"-thick stock, the blade-guard pivoting arms lift the antikickback pawls off the wood, negating their effectiveness. A narrow window in the top of the guard distorts the overhead view. A separate riving knife can be swapped out for non-through cuts.

■ **Dust collection:** The 4" dust port is located on the right of the cabinet, making an attached hose less of a trip hazard.

■ **Also worth noting:** This saw needed no blade-to-tabletop alignment out of the box. The blade-tilt indicator is too far out from the scale, creating parallax error that makes it difficult to read reliably. The narrow throat opening (only 3¾" wide) proved tight for blade changes. Only the blade wrenches store on the saw.


## Harvey C200-30
## $970

888-211-0397, harveywoodworking.com

■ **Rip fence:** The fence glides smoothly along its rail and locks solidly. Its aluminum fence can be used in two configurations on either side of the fence, but there is no scale for using the fence to the left of the blade. The front rail attaches to the tabletop via slotted holes, and the owner's manual gives no instruction on how to align it (up and down). Through trial and error, we eventually got it right.

■ **Miter gauge:** Expanding-bar adjustments make it easy to tighten the fit in the miter slots. It has stops only for 90° and 45° left and right.

■ **Blade guard/splitter/riving knife:** Channels inside the blade guard help capture dust at the front and rear of the blade, resulting in nearly total dust collection. However, these channels obscure your view when crosscutting.

■ **Dust collection:** Without a bottom panel, this saw's dust collection becomes less effective when not using the blade guard. The 4" dust port is located on the right of the cabinet, making an attached hose less of a trip hazard.

■ **Also worth noting:** The Harvey is one of three saws with a magnetic power switch, preventing accidental start-ups after a power interruption. When changing blades, the shouldered arbor nut must fit into the hole of its mating washer, a clumsy process. Harvey's dado insert (an optional accessory) has a rear tab that tucks under the top, but ours had to be trimmed to fit. The owner's manual lacks some key instructions, and some assembly steps are presented in incorrect order. None of the accessories store on the saw.


## Jet ProShop JPS-10
## $1,500

800-274-6848, jettools.com

■ **Rip fence:** The aluminum fence faces arrived perfectly flat, straight, and square to the table, and the fence glides nicely along the rails. There is no scale for using the fence to the left of the blade.

■ **Miter gauge:** Rather than a T-washer, the entire bar is T-shaped to match the miter slots, and screw expanders in the bar snug up the fit if needed. It has stops only for 90° and 45° left and right. Although there's a storage slot on the cabinet for the miter gauge, the front fence rail impedes access to it.

■ **Blade guard/splitter/riving knife:** The blade guard and antikickback pawls mount separately to the splitter and work well. However, the guard's narrow overhead view window restricts the sight line to the blade. A separate riving knife can be swapped out for cuts when you don't need the guard assembly.

■ **Dust collection:** Despite a shroud around the blade, dust built up a bit inside the cabinet, probably because the flat cabinet bottom couldn't direct errant dust to the center-mounted 4" port.

■ **Also worth noting:** One of three saws with a magnetic power switch, preventing accidental start-ups after a power interruption. The blade-tilt lock, separate from the handwheel, provides a more solid locking action than those in the center of handwheels. The open-ended throat plate slides into place after installing the blade guard/splitter, but this design allows the plate to flex, making it difficult to level the loose ends with the table surface. When changing blades, we found it clumsy to fit the triangular-holed arbor-nut wrench onto the hex nut.


## Laguna Fusion F1
## $1,000

800-234-1976, lagunatools.com

(Price includes optional mobility kit.)

■ **Rip fence:** It has an aluminum face only on the left side, so the fence cannot be used as easily to the left of the blade, and there is no scale there if you wanted to.

■ **Miter gauge:** Like the Jet JPS-10, it has a T-flange bar, but lacks adjusters to eliminate a slightly sloppy fit in the miter slot without peening. It has stops only for 90° and 45° left and right.

■ **Blade guard/splitter/riving knife:** The antikickback pawls are permanently mounted to the splitter, but the blade guard can be removed. The dust-collection port on the guard greatly enhanced dust removal.

■ **Dust collection:** The 3" hose connecting the blade shroud to the external dust port does not have a clamp and it came off several times in testing. We added one (access to put one on is tight) and then the dust collection was excellent.

■ **Also worth noting:** Its thin, flexible stamped-steel extension wings seem inadequate for a saw at this price. Like the Jet, its throat plate is open-ended and shares the same problems. The triangular-holed arbor-nut wrench proves difficult to get onto the hex nut. With two fixed casters, you lift this saw by its fence rails and move it like a wheelbarrow. It works okay, but if you're shorter than about 6', you may find it difficult to lift high enough to move it. We found the owner's manual difficult to follow because of its small text, tiny illustrations, and parts numbered without regard to order of assembly. All included accessories store on the saw.


## Powermatic PM1000
## $2,200

800-274-6848, powermatic.com

■ **Rip fence:** The UHMW-plastic faces on this hefty fence arrived flat and square, and the fence slides nicely along the rail. It tied for the least amount of deflection among the T-square-style fences. There is no scale for using the fence to the left of the blade.

■ **Miter gauge:** This is the beefiest unit among the test group, and the only one that comes with a fence and flip-stop. It has bar-fitting adjusters and five stops. Unfortunately, the stops have too much slop in them with no way to adjust.

■ **Blade guard/splitter/riving knife:** One of our favorite blade guards, with great visibility of the blade. The saw comes with a separate riving knife for when you can't use the guard. Powermatic also sells an optional thin-kerf riving knife.

■ **Dust collection:** A blade shroud and hose connect directly to the 4" port for great dust collection. The cabinet bottom panel slopes toward the port, but because there's no port opening into the cabinet's interior, the dust cannot get sucked out with the shroud hose connected—a missed opportunity.

■ **Also worth noting:** One of three saws with a magnetic power switch, preventing accidental start-ups. Beefy handwheels for tilt and blade-height adjustments turn smoothly and with authority. This saw does not come with a blade. The rip fence is the only included accessory that stores on the saw.

## Ridgid R4512
## $650

866-539-1710, ridgidpowertools.com

■ **Rip fence:** T-slots on the aluminum fence faces and top provide a way to attach accessories, such as hold-downs. An auxiliary low-profile fence swings to either side and extends under the blade guard for thin or narrow rips. Although the front aluminum fence rail consists of two equal-length pieces, we found the fence glided as smoothly as if it were on a single rail. We struggled to align the fence with the blade. Left- and right-side pointers, rather than hairline cursors, sit high above the scale and, along with hard-to-distinguish increments on the scale, make it more difficult to use accurately.

■ **Miter gauge:** A single T-slot washer at the end of the bar holds the gauge securely when pulling the head off the table, but the bar lacks a built-in adjuster.

■ **Blade guard/splitter/riving knife:** The blade guard and antikickback pawls mount separately to the splitter, and when using all three they have more wobble than we'd like. Using the splitter alone alleviates much of this play.

■ **Dust collection:** The 4" port below the funnel-shaped bottom panel helps evacuate most of the dust.

■ **Also worth noting:** Although we were able to align the blade to within .002" of the miter slots, whenever we moved the saw around on its mobile base, it would get out of alignment and we'd have to realign it. The blade-tilt stops adjust via setscrews in the cast-iron top, an easy process. The throat insert plate locks in place with a twist knob; Ridgid does not offer dado or zero-clearance inserts. We found the power switch difficult to locate without looking. With two fixed casters and a single swiveling caster, this saw maneuvers easily, but the bolts connecting the assembly kept working loose (lock nuts would help) and the plastic feet tended to fall off when moving this saw around. All included accessories store on the saw.

## Rikon 10-205
## $1,100

877-884-5167, rikontools.com

■ **Rip fence:** This fence proved difficult to align parallel to the blade, and went out of alignment several times during testing. It's difficult to set rip width accurately by using the scale. Flimsy plastic connectors do little to help align and strengthen the two-part aluminum fence rails.

■ **Miter gauge:** The bar has a single T-slot washer, but it lacks a slot adjuster.

■ **Blade guard/splitter/riving knife:** The blade guard and antikickback pawls mount individually to the splitter, but the splitter cannot be removed. Instead, it locks into one of three positions: high for use with guard and pawls; middle for use as a riving knife; and low for use with dado setups.

■ **Dust collection:** The 4" port below the funnel-shaped bottom panel helps evacuate most of the dust.

■ **Also worth noting:** Although it needed only .002" of adjustment, this saw proved easiest (among those models with trunnions mounted to the top rather than the cabinet) to align the blade to the top. You adjust the blade-tilt stops via setscrews in the top. Despite a reasonable 4⅛" throat opening, this saw has only ⅞" clearance from the end of the arbor shaft to the right side of the opening, making it a knuckle-buster to change blades. With four swiveling casters and a single kickstand, this model was easiest to move around. All included accessories store on the saw.

## SawStop's safety system keeps your hands safe

All SawStop tablesaws use a proprietary flesh-detection system to prevent serious operator injuries. Here's how it works: The system sends a safe, low-voltage electrical current through the blade, and if a finger (or any other highly conductive material, such as metal or wet pressure-treated lumber) should touch the blade, the device triggers, thrusting an aluminum brake pawl into the blade to stop it almost instantly and drop it safely below the table. It happens so fast you won't see it, but should you trigger it with your finger, you'll likely get only a small nick in the skin. After an activation, you'll need to replace the brake cartridge ($80 for a 10"; $100 for an 8" dado unit) and your blade. Watch a video demonstration of this at woodmagazine.com/sawstop.



## SawStop CNS175-SFA30
## $1,699

866-729-7867, sawstop.com

■ **Rip fence:** The scale and hairline cursors make it easy to set this fence precisely. However, this fence proved difficult to align to the blade, and went out of parallel several times during testing. We recommend upgrading to the 36" T-Glide fence system (which we tested on the SawStop PCS175), a $200 upgrade.

■ **Miter gauge:** The bar has a single T-slot washer, but without any adjuster, we could not remove the side-to-side play in the miter slots without peening the bar.

■ **Blade guard/splitter/riving knife:** The antikickback pawls mount permanently to the splitter, but the included riving knife swaps out easily when needed. The blade guard mounts separately to the splitter, and provides a good overhead view for lining up cuts.

■ **Dust collection:** The blade shroud with 4" port helps to collect most dust, but the open cabinet bottom allowed some dust to fall to the floor.

■ **Also worth noting:** This machine's flesh-detection system (sidebar, at *left*) prevents serious injuries like no other tablesaw can. Assembly of this machine proved easy thanks to an exceptional owner's manual and clearly sorted and labeled hardware. This saw's blade was aligned to the miter slots within .001" out of the box, best among the test group. You adjust the blade-tilt stops via setscrews in the top. The widest throat opening (4½") and space beyond the end of the arbor (1⅝"), coupled with beefy, angled wrenches, make blade changes easiest among the test group. The included lock-down phenolic throat insert plate has a 3⁄16"-wide blade slot, providing nearly zero clearance. All included accessories except the blade guard store on the saw. The optional dado blade brake works only with an 8" dado set.

# Mid-range tablesaws: Bigger than a job-site.

| MODEL | PERFORMANCE RATINGS (1) | | | | | | | | | | | | | DIMENSIONS, INCHES | | CAPACITIES, INCHES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRIMARY | | | | | SECONDARY | | | | | | | | | | | | | | |
| | OBSERVED POWER | ABSENCE OF DEFLECTION | RIP-FENCE SCALE ACCURACY/READABILITY | MITER-GAUGE ACCURACY/RELIABILITY | EFFECTIVENESS OF BLADE GUARD/PAWLS/SPLITTER | EASE OF CHANGING BLADES | EASE OF USING ON/OFF SWITCH | EASE OF ALIGNING TABLETOP TO BLADE | EASE OF ALIGNING RIP FENCE TO BLADE | EASE OF ADJUSTING BLADE-TILT STOPS | BEVEL-SCALE ACCURACY/READABILITY | DUST-COLLECTION EFFECTIVENESS | EASE OF USING HANDWHEELS | OVERALL, HxDxL | TABLETOP (INCLUDING EXTENSION WINGS), DxL | MAX. CROSSCUT (2) | MAX. RIP, LEFT OF BLADE | MAX. RIP, RIGHT OF BLADE | MAX. BLADE HEIGHT AT 90° BEVEL | MAX. BLADE HEIGHT AT 45° BEVEL |
| DELTA 36-725T2 | A- | A | A | A | B | C | C | A | A | A | A | B+ | A- | 36¾ × 40 × 62½ | 27 × 40¼ | 11¾ | 15 | 30 | 3⅛ | 2¼ |
| GRIZZLY G0771Z | B+ | B | A | A | D | C | B | A | A | C | C | B | A- | 36 × 40¼ × 64 | 27 × 40¼ | 11¾ | 16 | 31 | 3¼ | 2¼ |
| HARVEY C200-30 | A | B+ | A | B- | C | B | A | A | A- | B | A | B+ | B- | 34½ × 39 × 62 | 27 × 40 ¼ | 11½ | 11¼ | 31½ | 3⅛ | 2⅛ |
| JET PROSHOP JPS-10 | A | B+ | A- | B+ | B | B+ | B | A | A | B+ | A | B+ | A- | 34½ × 39¾ × 84¼ | 27 × 44 | 9 | 12 ¾ | 29½ | 3⅛ | 2⅛ |
| LAGUNA FUSION F1 | B+ | B- | A | C | B | B+ | B | C | A | C | A | A | A- | 34½ × 39¾ × 59⅝ | 27 × 44 | 8¾ | 17 | 29 ½ | 3⅛ | 2⅛ |
| POWERMATIC PM1000 | A | A | A- | C- | A | A | A | A | A | A- | B | A- | A | 34 × 43 × 61 | 27 × 40 | 10 | 11 ½ | 30¾ | 3⅛ | 2⅛ |
| RIDGID R4512 | A | A | C+ | B+ | B- | C | C | C | C | A | B | B | A- | 37 × 38½ × 57¼ | 27 × 40¼ | 11¾ | 14¾ | 29¾ | 3⅛ | 2¼ |
| RIKON 10-205 | A | A | C | C | C | D | B | B- | D | A | B | B | A- | 37½ × 39 × 57 | 27 × 40 | 11½ | 14½ | 29½ | 3⅛ | 2⅛ |
| SAWSTOP CNS175-SFA30 | B+ | A | A | C | A | A | A | A | D | A | A | B+ | A | 34¾ × 40 × 58½ | 27 × 44 | 10⅝ | 16½ | 30½ | 3⅛ | 2¼ |
| SAWSTOP PCS175-TGP236 | A | A | A | A | A | A | A | B+ | A | B+ | A | A- | A | 34 × 33 × 69⅛ | 27 × 44 | 10⅛ | 12 | 36 | 3⅛ | 2¼ |
| SHOP FOX W1837 | A | B | A | A | D | C | B | A | A | B | C | B | A- | 36 × 40¼ × 64 | 27 × 40¼ | 11¾ | 16 | 31 | 3¼ | 2¼ |


2020 WOOD Magazine TOP TOOL Mid-Range Tablesaw

## SawStop PCS175-TGP236
## $2,868

**866-729-7867, sawstop.com**

(Price reflects 36" T-Glide fence and integrated mobile base. Buy this saw with basic rip fence and no mobile base for $2,450.)

■ **Rip fence:** This exceptional fence glides smoothly, locks solidly, adjusts easily, and tied for the least amount of deflection among the T-square-style fences. Its 36" rip capacity was widest among the tested saws, and the scale and hairline cursor prove easy to read and accurate.

■ **Miter gauge:** It has a single T-slot washer and three spring-loaded ball bearings in the side of the bar to maintain a perfect fit in the miter slots.

■ **Blade guard/splitter/riving knife:** One of the best blade guards, providing great blade visibility. The antikickback pawls mount permanently to the splitter, but the included riving knife swaps out easily when needed.

■ **Dust collection:** The blade shroud with 4" port helps to collect most dust, but there's no provision for collecting dust that falls to the cabinet bottom.

■ **Also worth noting:** This machine's flesh-detection system (*previous page*) prevents serious injuries like no other tablesaw can. Exceptional owner's manual and clearly sorted and labeled hardware made assembly a breeze. The top needed only a few thousandths of an inch of adjustment to align with the blade. Although it has the preferred cabinet-mounted trunnions, setscrew adjusters required for making this adjustment proved more difficult than it would be without them. It tied for having the best handwheels that turn smoothly and with authority. The widest throat opening (4½") and space beyond the end of the arbor (1⅝"), coupled with beefy, angled wrenches, make blade changes easiest among the test group. The included lock-down phenolic throat insert plate has a 3⁄16"-wide blade slot, providing nearly zero clearance—best among the standard plates in this test. The four-caster mobile base works well without being in the way. All included accessories except the blade guard store on the saw. The optional dado blade brake works only with an 8" dado set.

# smaller than a cabinet

| NUMBER OF ANGLE STOPS | HANDWHEEL TURNS, FULL DOWN TO FULL UP | HANDWHEEL TURNS, FROM 0° TO 45° | ACCESSORIES (3) STANDARD | ACCESSORIES (3) OPTIONAL | WEIGHT, LBS | CORD LENGTH, FEET | WARRANTY, YEARS | COUNTRY OF ASSEMBLY (4) | SELLING PRICE (5) |
|---|---|---|---|---|---|---|---|---|---|
| 9 | 35 | 42 | A, M, P | D, Z | 185 | 6 | 5 | T | $600 |
| 9 | 35 | 41 | A, D, P, R | M, Z | 286 | 6 | 1 | C | $925 |
| 3 | 28 | 61 | A, D, G, P, R | M, S, Z | 360 | 7 | 2 | C | $970 |
| 3 | 21 | 43 | A, P, R | D, M | 275 | 6 | 5 | T | $1,500 |
| 3 | 21 | 43 | A, G, P, R | D, M, Z | 200 | 6 | 2 | T | $999 |
| 5 | 10 | 34 | P, R | D, M, T | 330 | 6½ | 5 | T | $2,200 |
| 3 | 35 | 41 | A, M, P | | 190 | 6 | 3 | C | $650 |
| 3 | 36 | 43 | A, M, P | D | 260 | 6 | 5 | C | $1,100 |
| 3 | 17 | 20 | A, P, R, Z | B, C, D, G, M, S | 245 | 9 | 1 | T | $1,699 |
| 3 | 18 | 28 | A, P, R, Z | B, C, D, G, M, O, S | 408 | 9 | 2 | T | $2,868 |
| 9 | 35 | 41 | A, D, M, P, R | Z | 243 | 6 | 2 | C | $1,244 |

▶Learn how to get the most from your tablesaw. woodmagazine.com/tablesawtechniques

1. A Excellent
   B Good
   C Fair
   D Poor

2. Measured from front of blade at maximum height to front edge of table.

3. (A) 10" general-purpose blade
   (B) 8" blade-brake cartridge
   (C) Over-arm dust collection
   (D) Dado throat plate
   (G) Dust-collecting blade guard
   (M) Mobile base/built-in mobility
   (O) Outfeed table
   (P) Pushstick
   (R) Full-kerf low-profile riving knife
   (S) Sliding crosscut table
   (T) Thin-kerf low-profile riving knife
   (Z) Zero-clearance throat plate

4. (C) China
   (T) Taiwan

5. Prices current at time of article production and do not include shipping, where applicable.


## Shop Fox W1837
## $1,244

800-840-8420, woodstockint.com

■ **Rip fence:** Like the Grizzly fence, this fence has T-slots on both faces, but access to them is blocked by plastic end caps.

■ **Miter gauge:** Identical to the Grizzly model.

■ **Blade guard/splitter/riving knife:** The antikickback pawls mount permanently to the splitter, but the blade guard can be removed. The assembly wobbles more than those on other saws. When ripping 1½"-thick stock, the blade-guard pivoting arms lift the antikickback pawls off the wood, negating their effectiveness. A narrow window in the top of the guard distorts the overhead view. A separate riving knife can be swapped out for non-through cuts.

■ **Dust collection:** The 4" port below the funnel-shaped bottom panel helps evacuate most of the dust.

## Invest your tablesaw dollars in these proven models

Perhaps not surprisingly, the SawStop PCS175-TGP236 stood out from this group of tablesaws after extensive testing. This saw excelled in nearly every category we evaluated, and its flesh-detecting safety feature vaults it to the head of the class. It earns our Top Tool award.

We also recognize the Delta 36-725T2 as a Top Value. It performs well, and at $600 is the lowest-priced model in the test, making it a great entry-level tablesaw.

Produced by **Bob Hunter** with **Jan Svec**

■ **Also worth noting:** This saw needed the most blade-to-top alignment out of the box, but its cabinet-mounted trunnions adjust easily. The blade-tilt indicator is too far out from the scale, making it difficult to use accurately; there is no adjustment for this. The 3¾"-wide throat opening makes blade changes difficult. It has three casters for easy maneuverability, but you must step on each caster's kickstand to move the saw. Only the blade wrenches store on the saw.

# Basic CNC Trivet

*Simple design tools make it easy to create great-looking projects fast.*

*By Randy Johnson*

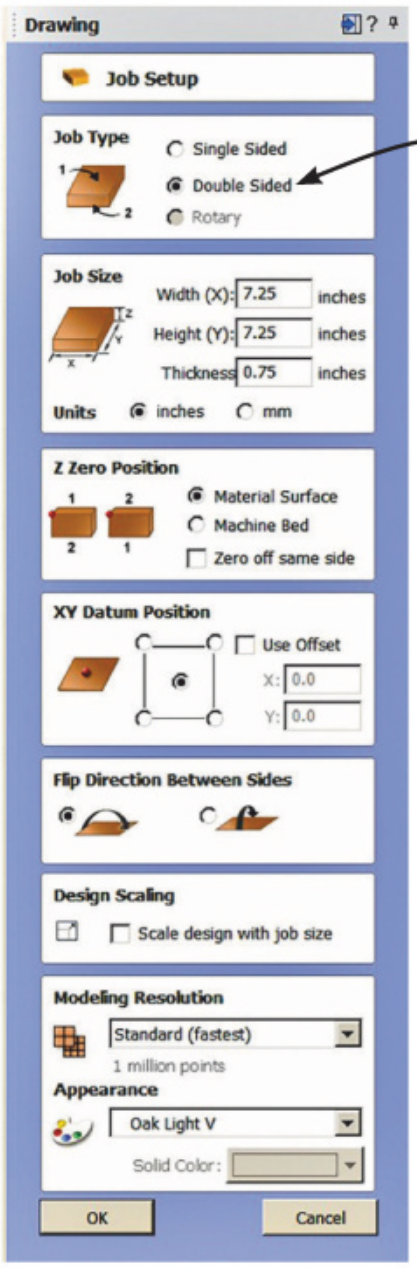
▶ I used Vectric VCarve Pro to design this project, but other CAD/CAM programs will work, too.

Two-sided trivets with intersecting cuts on each face are typically made with straight grooves routed at right angles to each other using the router table. More interesting designs require custom templates or special jigs. That's where a CNC router comes in handy—it lets you skip the template and jigs, and go straight to cutting. A CNC cuts straight lines, angles, and curves with ease. This frees you up to focus more on the design and less on complicated cutting.

A two-sided trivet makes a good design exercise because some combinations don't work well together (**Watch for these pitfalls,** *page 50*). For me, figuring out what combinations work is part of the challenge and the fun of working with a CNC. It took several revisions to get the size and spacing of the stars and circles just right for this project. Because you can preview the end result in the CAD software before cutting, you reduce the risk of wasting material.

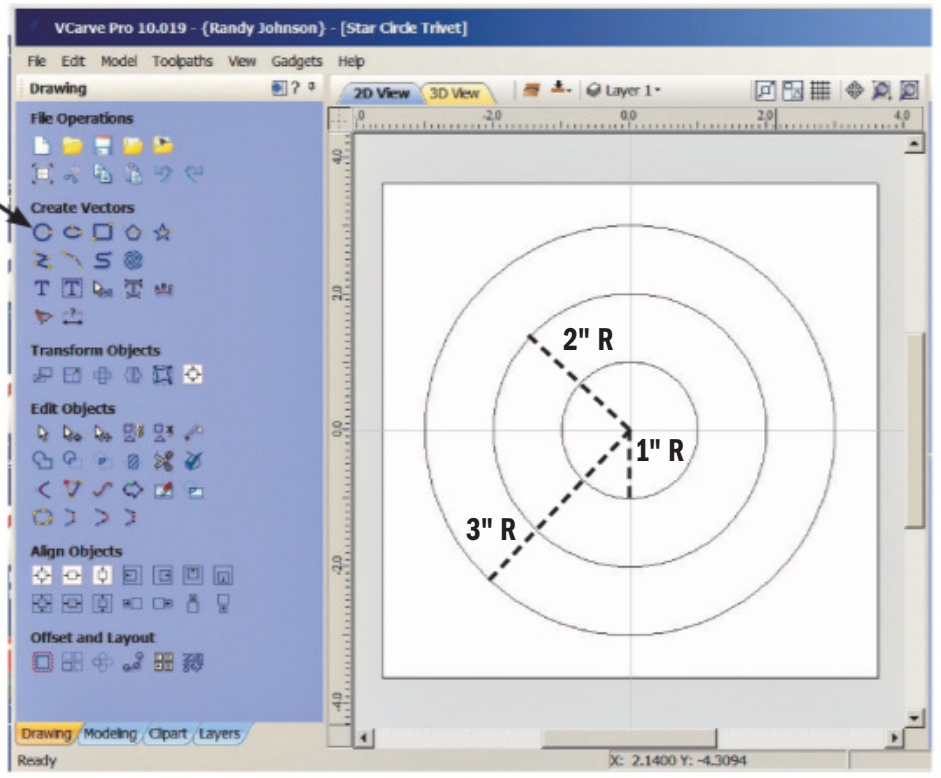
***Note:*** *In this article, I use decimal dimensions to match the way numbers are entered into the design software.*

# Create the design

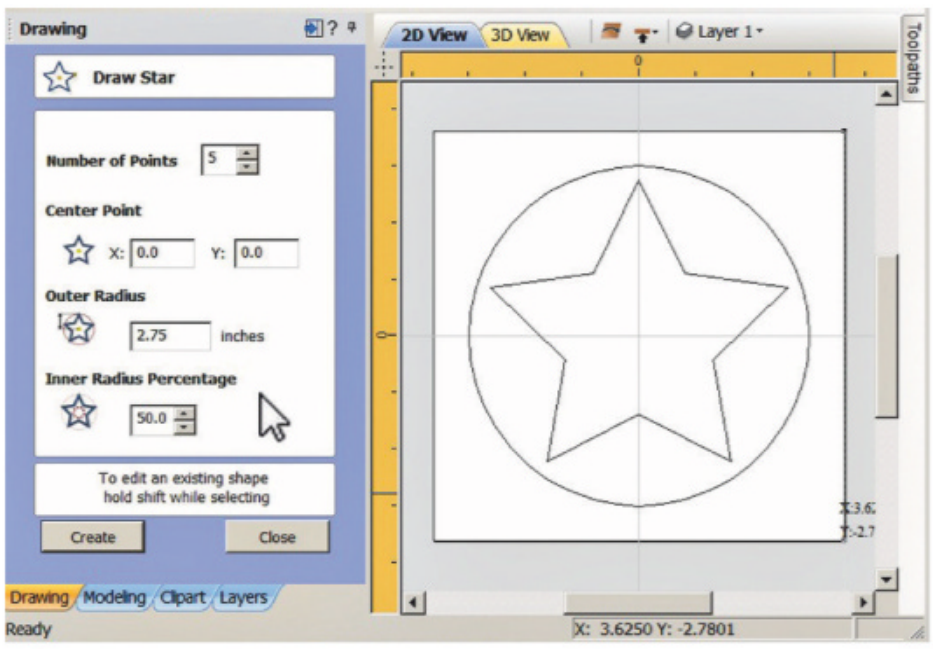



Circle drawing tool

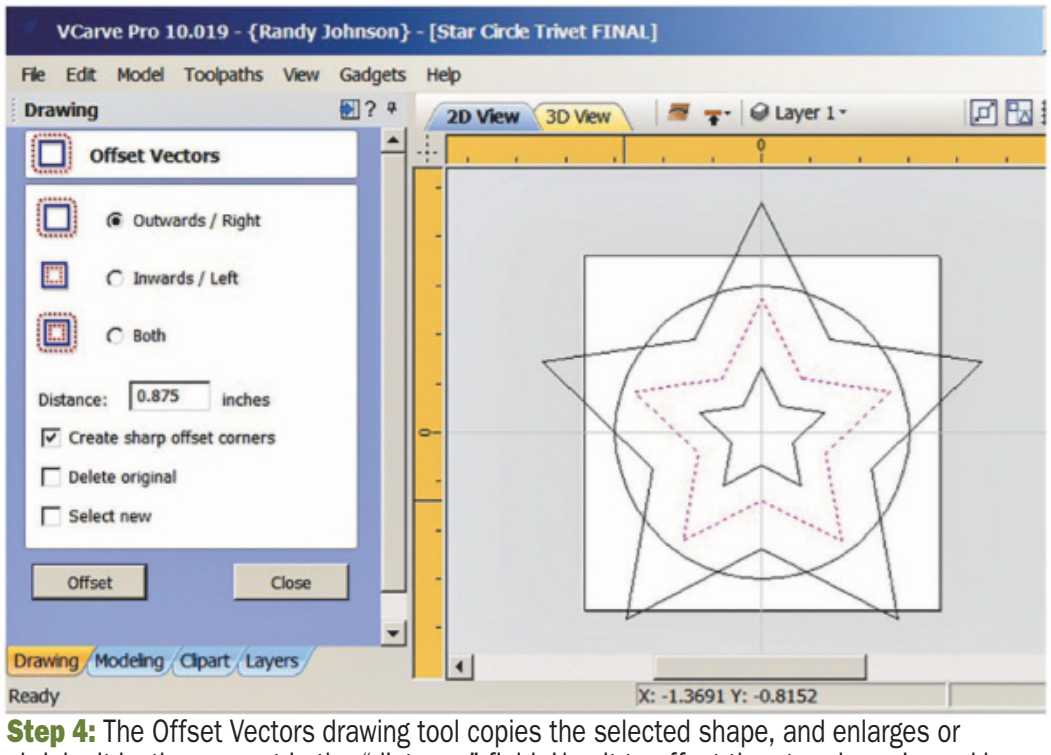
**Step 1:** Create a new double-sided job setup. The circles will be cut on the top face and the stars on the bottom face. I set this project at .75×7.25×7.25" so I could use standard 1×8 lumber. Make it larger or smaller to fit your needs.




**Step 2:** Start the drawing with three concentric circles. The dimensions shown here work well when combined with the star on the other side.

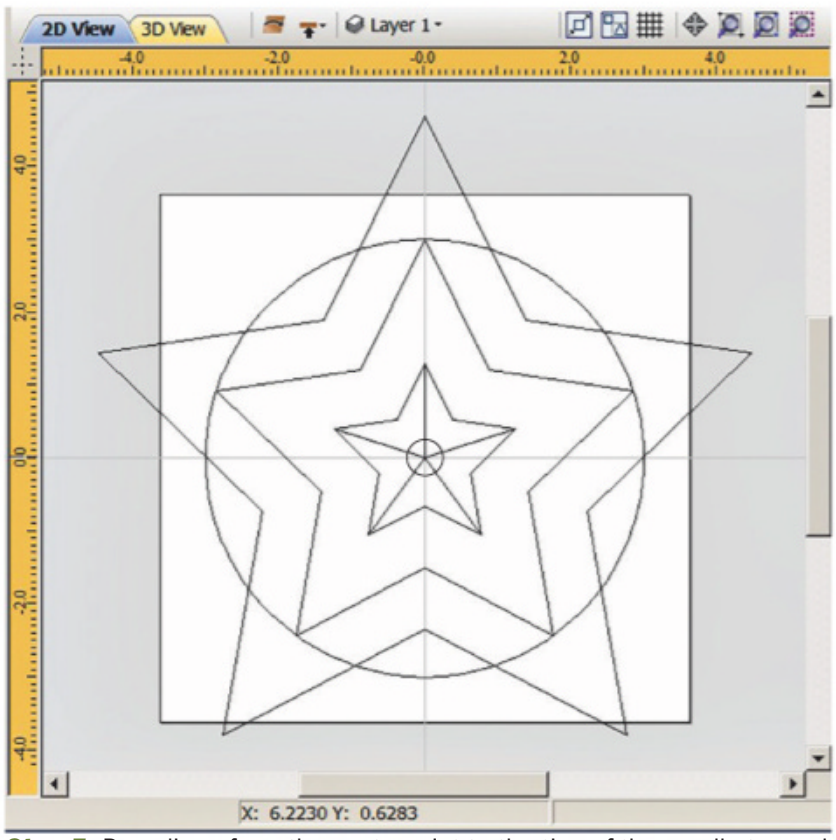



**Step 3:** On the star side of the design, center a 3"-radius circle (same as the large circle on the other side) and then add a star shape with a 2.75" radius.

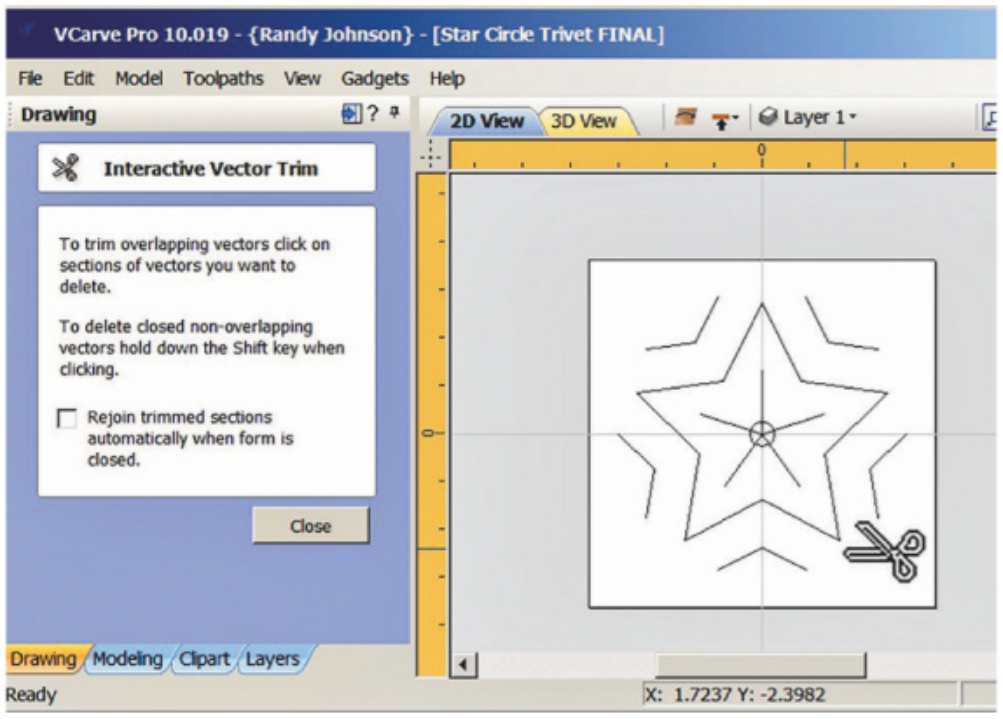



**Step 4:** The Offset Vectors drawing tool copies the selected shape, and enlarges or shrinks it by the amount in the "distance" field. Use it to offset the star shape inward by .625" to create a smaller inner star, and outward by .875" to create a larger outer star.

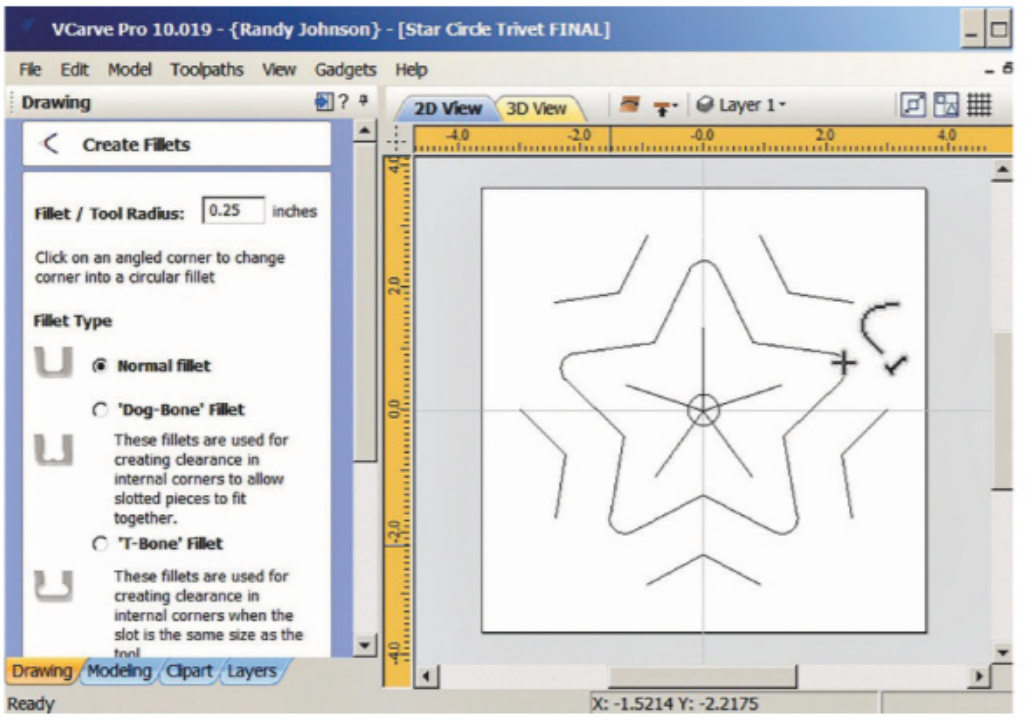
***Note:*** *It's okay that the outer star extends beyond the material (white) area. The large star gets trimmed back in a later step.*



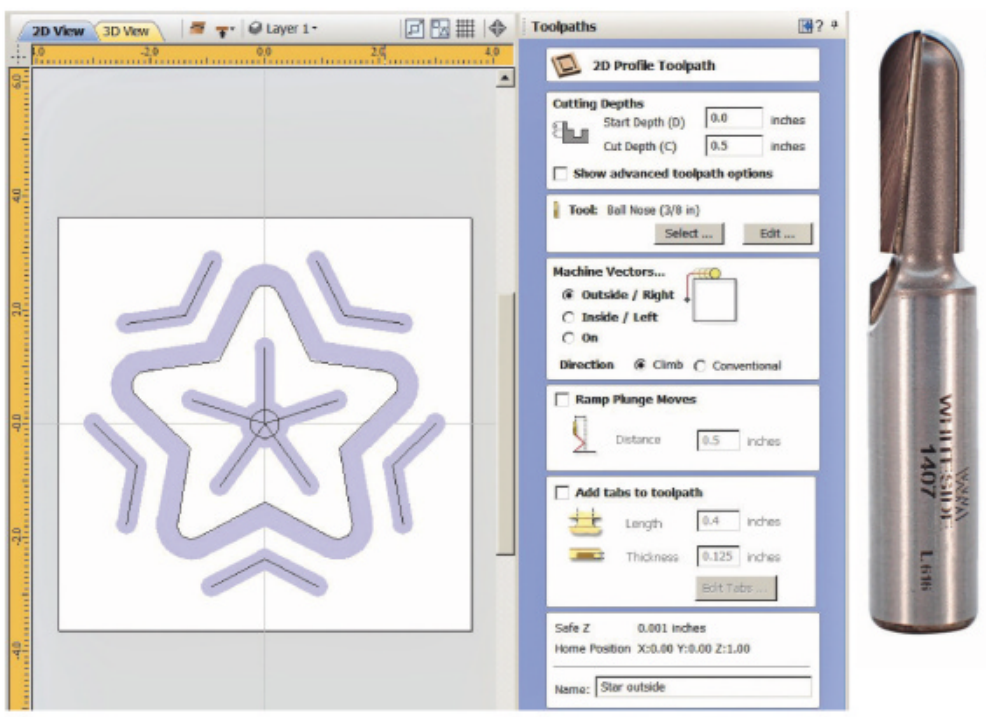

**Step 5:** Draw lines from the centerpoint to the tips of the small star and a .25"-radius circle at the center.




**Step 6:** Most CAD programs provide a trimming tool that allows you to remove parts of a design. Trim the lines to match the design shown above.

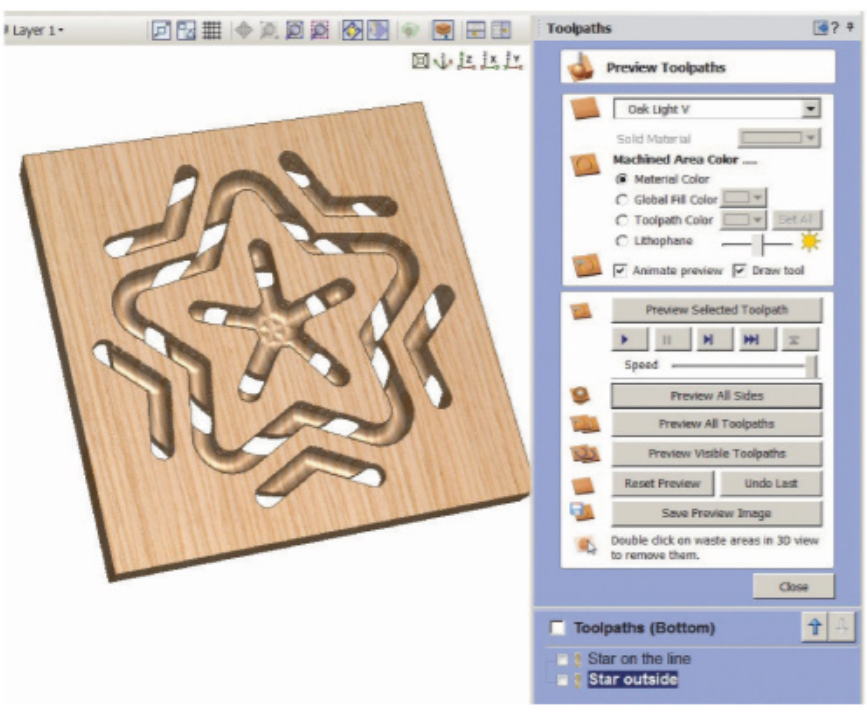



**Step 7:** Rounded points are less likely to break off during cutting and afterwards, so round over the tips of the star with a .25"-radius fillet.






▶A ballnose bit creates a nice round-bottom groove. For a different effect, try a straight bit or V-bit.




**Step 8:** Create the toolpaths for the trivet. The purple areas show the material to be removed by the ⅜"-dia. ballnose bit [**inset**]. The .5" depth-of-cut ensures the two designs intersect, while leaving ¼" of material, sufficiently strong for most woods. I set the toolpath for the main star to cut to "outside" of the line. The remnants of the inner and outer star and the circles on the other side are all set to cut "on the line."

**Step 9:** Preview the star and circle toolpaths together to verify that there are no problems. If something doesn't look right, adjust your designs until the two sides intersect suitably.

## Watch for these pitfalls

When designing a two-sided object with intersecting patterns, analyze your design for these potential problems:

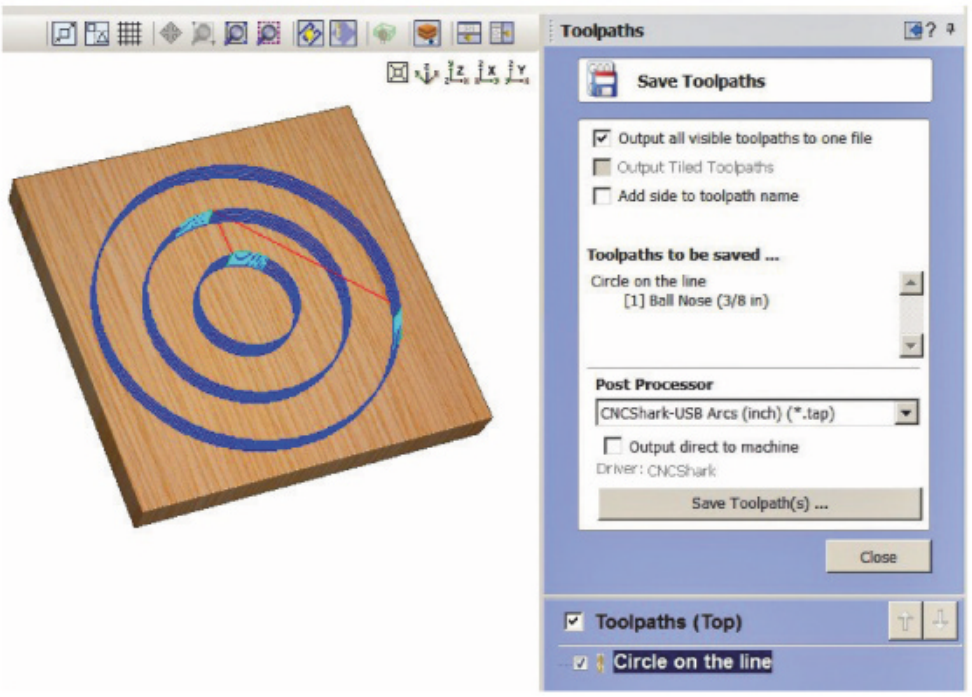
**1** A floating part will fall out of your design. Make sure all pieces are tied together.

**2** Avoid overhanging parts and sharp points that might break off if they are short grain.

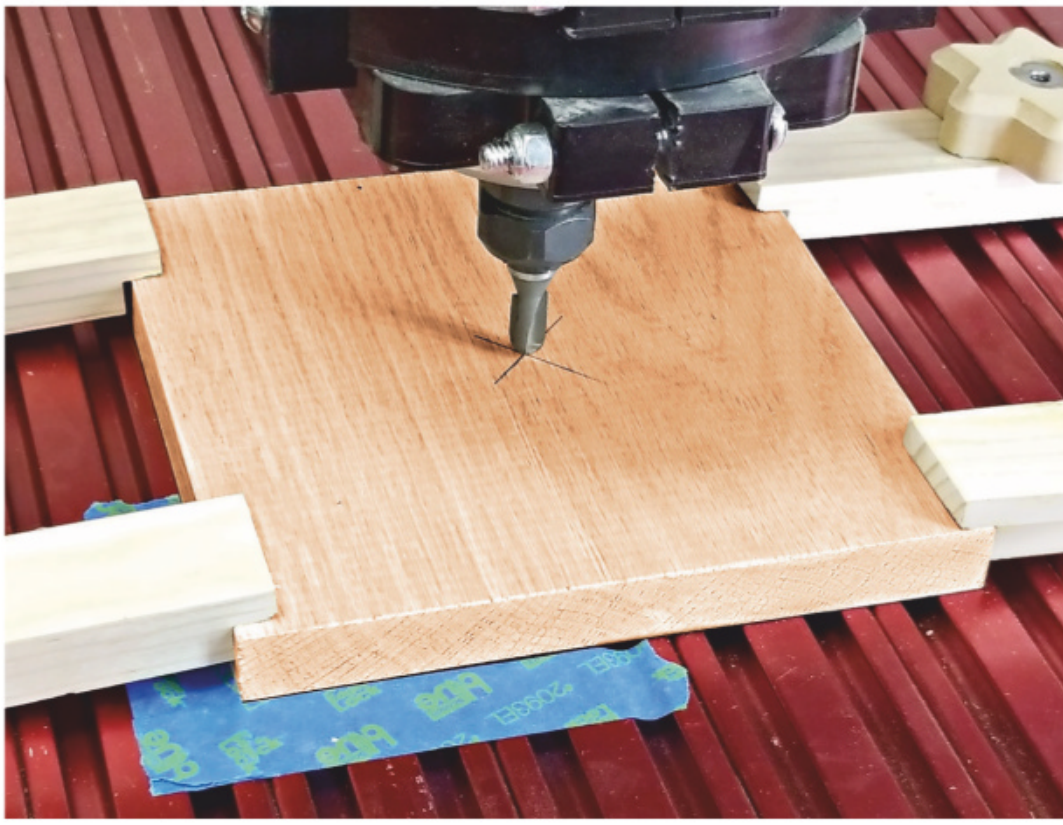
**3** Very thin parts may also break off. Move a tool path, or change the cutting tool to beef up such areas.

Adjust your design in the software to remedy these issues before you start cutting. Of course, cutting a test board exposes unforeseen problems, too.

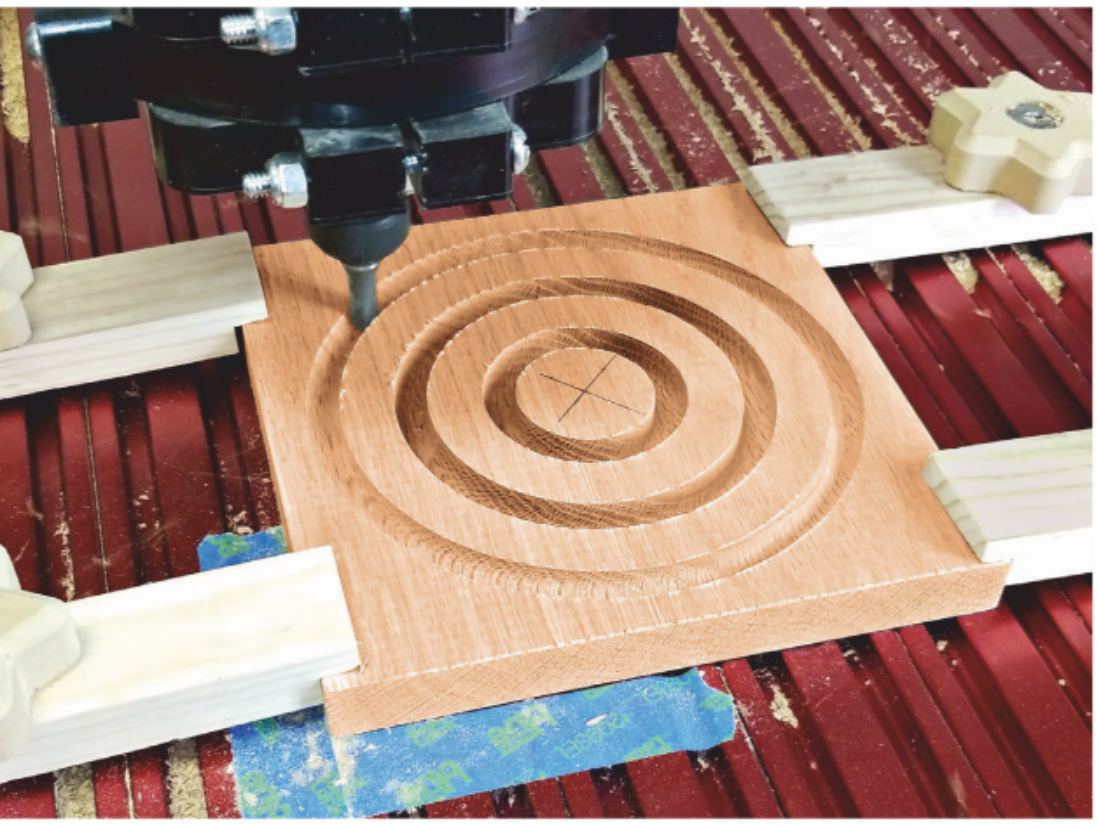
# Save and send




**Step 1:** Save the Circle and Star toolpaths. This step is called *post processing* and converts the lines in the drawing to machine G-code the CNC understands. Post processing is CNC-machine specific, so select the Post Processor that matches yours. The blue lines in the picture show the center of the router bit during cutting, which is why it's called a toolpath.



**Step 2:** Secure the material to the table. Low-profile holddown wood clamps reduce the risk of the router or bit hitting them, and won't harm the bit if it does. Set the router-bit X and Y zero points to the center of the design, and the Z zero location to the top face of the material. Add tape along one corner to aid in lining up the board when you flip it over to rout the other side.



**Step 3:** Load the toolpath for the circles and rout the first side.

**Step 4:** Flip the board over, secure it again, and run the toolpaths for the star side of the trivet. After routing, sand the trivet to remove the sharp edges and finish with a coat of wipe-on oil finish.

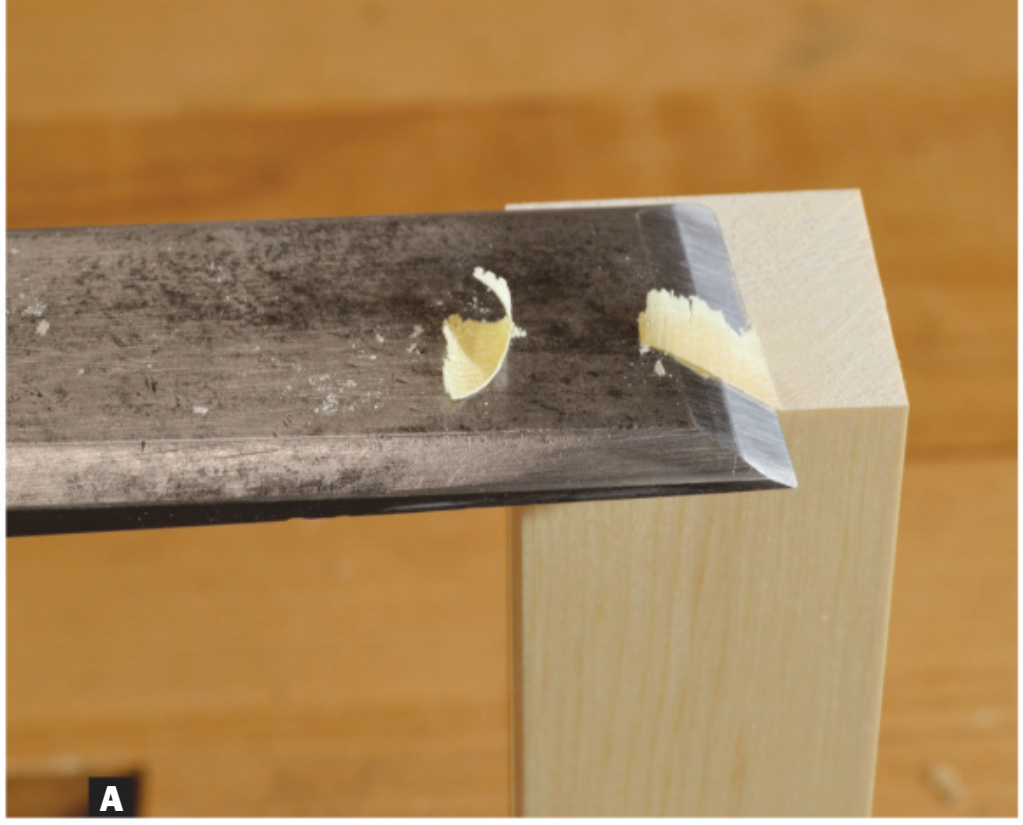
**Randy Johnson** is a lifelong woodworker and the author of *CNC Router Essentials*. Randy teaches CNC woodworking at Weekend with WOOD and Marc Adams School of Woodworking.

# Cutting-edge Chisel Skills

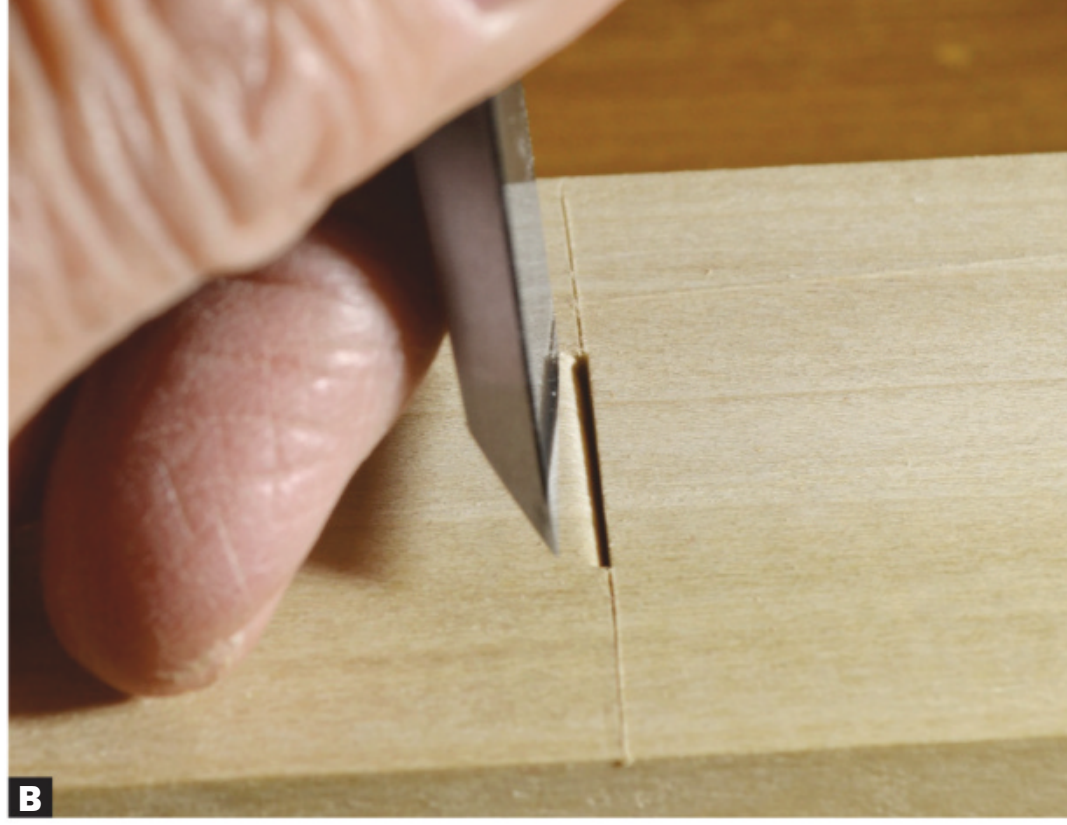
by Jeff Miller

A chisel may be the most versatile hand tool at your disposal. It looks like the simplest of tools—essentially just a sharp steel wedge—but appearances can be deceiving. There's much to learn about effectively putting a chisel to work. So let's get started.

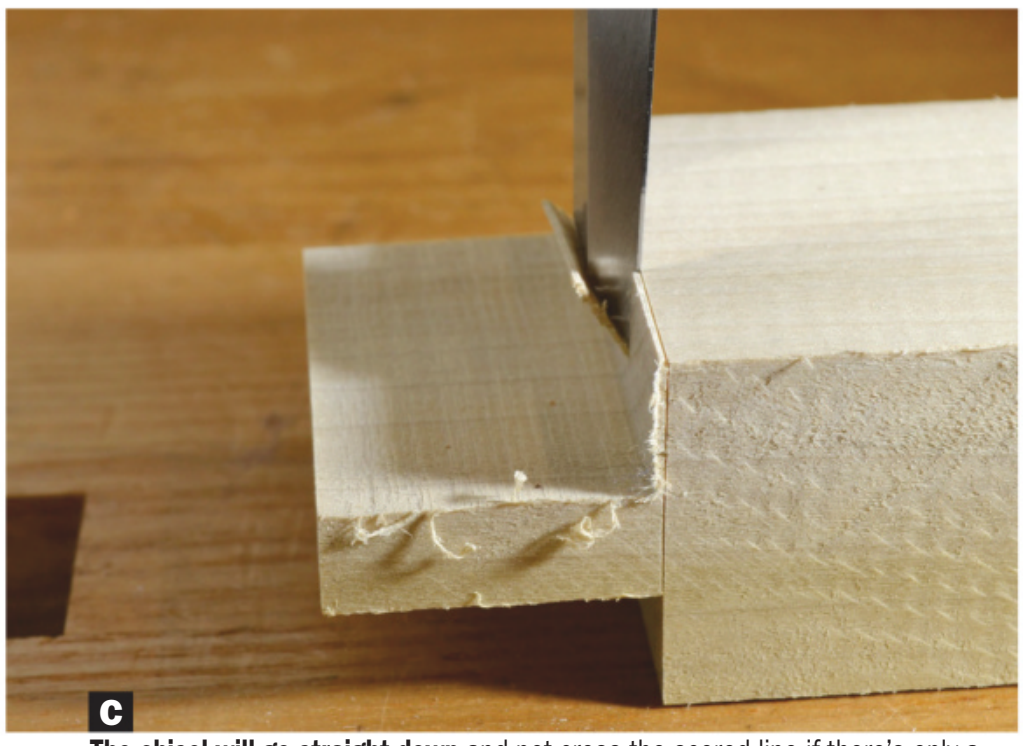
*Jeff Miller operates J. Miller Handcrafted Furniture in Chicago and often teaches at Weekend with WOOD. Learn more about his work and classes at furnituremaking.com.*



**Test chisel sharpness** by making an end-grain cut in softwood. A sharp tool will shave the wood easily and leave a smooth surface. A dull tool will push and tear the end grain.



**The chisel will be forced back** across the scored line if you simply place the edge in the scored line before chopping down. Equal pressure on both the chisel bevel and back leave the tool edge nowhere else to go.



**The chisel will go straight down** and not cross the scored line if there's only a bit of wood on the bevel side of the chisel. The waste wood will fall away without forcing the chisel back.

**Switch directions.** If grain direction doesn't favor cutting straight down on a dovetail pin, pare across it. But don't push all the way through and risk tear-out. Instead, finish the cut by coming back from the opposite direction.

## Chisel basics

▶ Flatten the backs of your chisels and get their cutting edges razor sharp. woodmagazine.com/sharpchisel

To help you do anything well, a chisel must have a sharp cutting edge and a flat back. Whether you buy a bargain-basement set, the most expensive chisels out there, or you work with Grandpa's hand-me-downs, take time to properly flatten the back and hone the edge [**Photo A**]. Doing so ensures success in all of the essential skills described here.

For an accurate chisel cut, always first score a line where you want the cut to be, using either a marking gauge or knife. That cut will not only *show* you where the chisel's edge should go, it also will *guide* the accurate placement of the cutting edge.

Even with a scored line, however, you can't simply fit the cutting edge into the line (with the bevel facing the waste side of the cut) and chop down. Physics dictates that doing so will drive the flat back of the chisel across the line. [**Photo B**]. To avoid such an oops, remove as much waste as possible first, leaving the scored line. That way, the chisel cut at the line meets less resistance on the bevel side of the tool. Removing less wood results in a true cut [**Photo C**].

Before you make a cut, consider grain direction. Chisels follow grain direction, and wood will cleave along the grain. If the cut gives you more than one choice in chisel direction, choose the path not likely to result in a stray cut or grain tear-out [**Photo D**].

Also pay attention to hand placement. It might be tempting to hold the work with one hand and inadvertently aim the chisel at that hand. Don't. Always keep both hands behind the cutting edge.

**There's no chance of workpiece movement** with the piece held firmly to a bench surface, positioned over a leg. Correct body position lends a clear view of the chisel's verticality.


**A vise will suffice** for paring work. When necessary, clamp a guide block to the workpiece to ensure accurate chisel placement. Hold the chisel tight to the block.

# 4 essential chisel skills

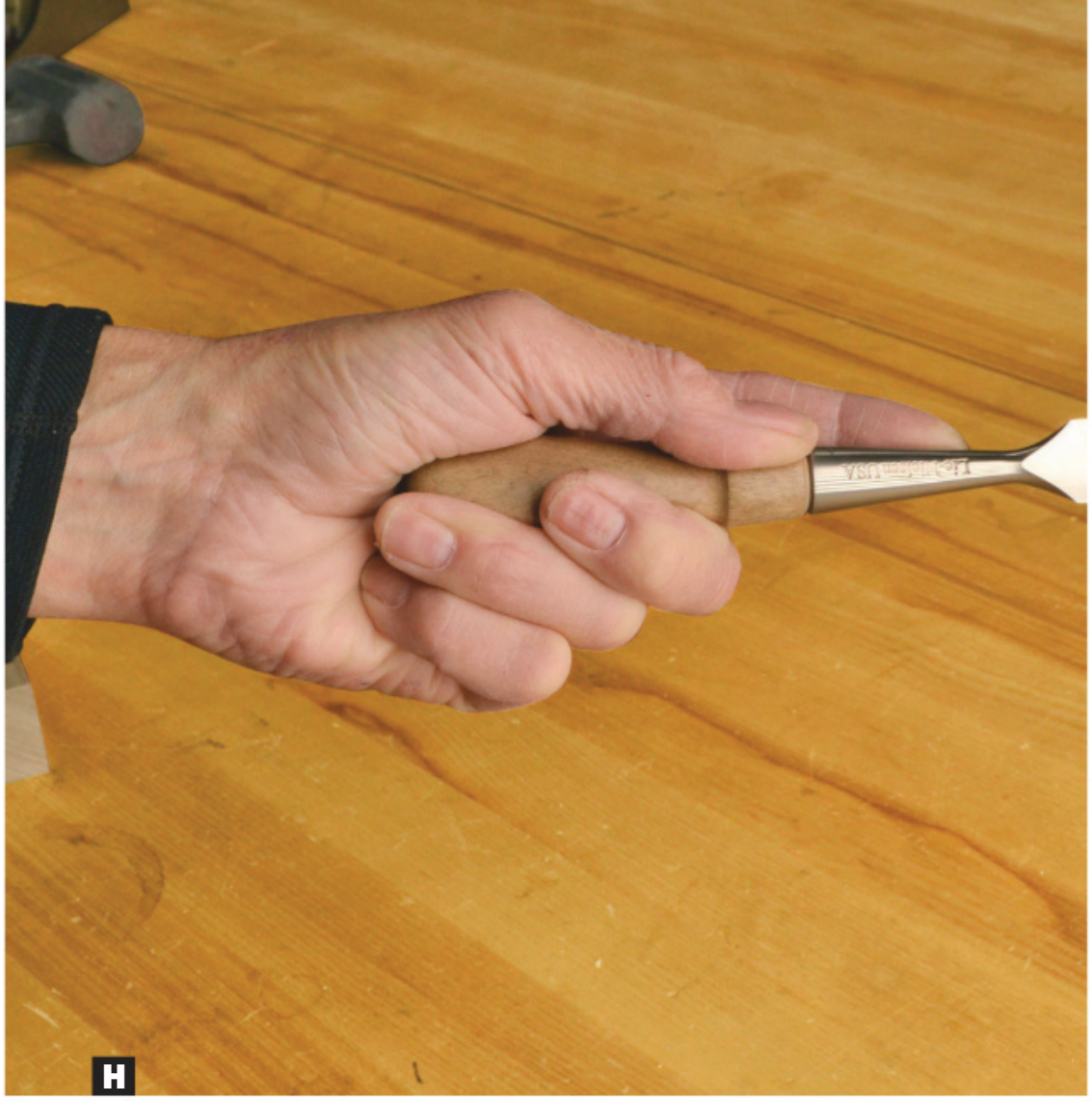
It pays to approach every chisel task knowing the most-appropriate method before you put steel to wood. These techniques will get you through virtually every job involving a chisel.

**1 Chopping** This skill entails removing a lot of waste quickly, such as when cutting mortises or dovetails. It requires the considerable force of striking the end of the chisel's handle with a mallet. Though many fancy wood mallets exist, I prefer a plastic deadblow mallet for chopping—it won't mar the chisel handle and can deliver plenty of force.

For a good chopping grip, wrap all your fingers around the handle, as you would hold a baseball bat. Always chop with the workpiece clamped to a rock-solid surface. Hold the work stationary between bench dogs, secure it with a holdfast, or clamp it to a board held in a vise [**Photo E**]. Don't try to hold the workpiece between vise jaws—it will move with each mallet strike.

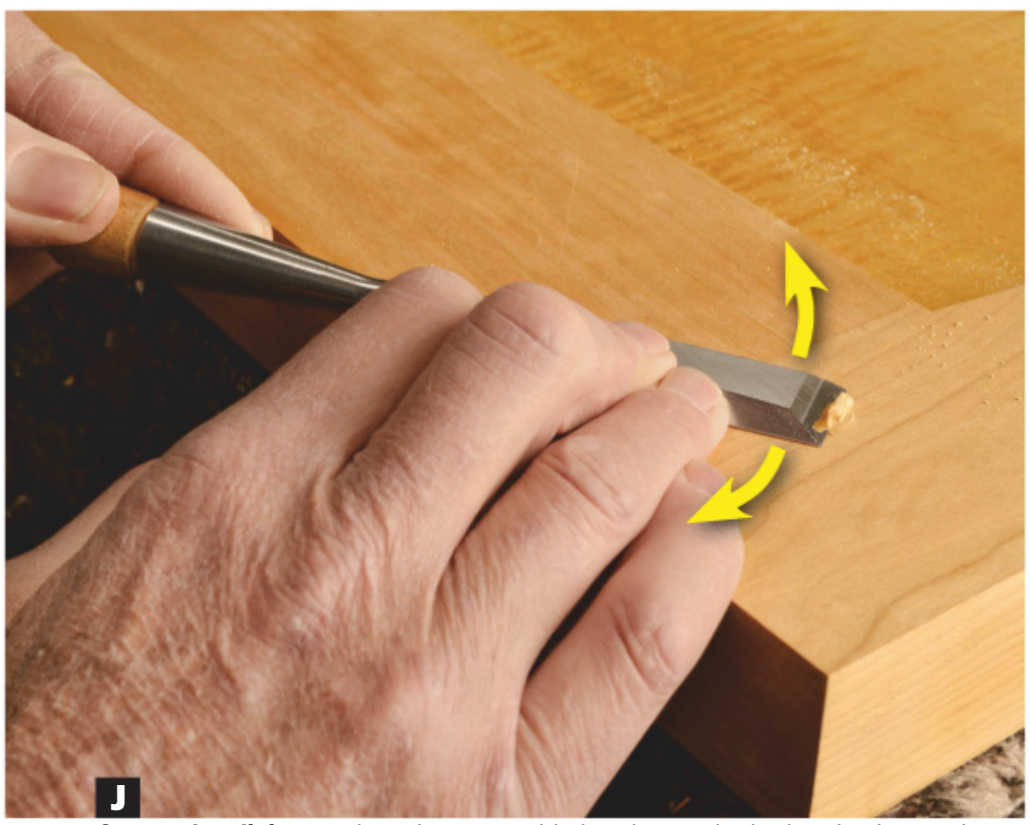
**2 Paring** For refined work, such as cleaning up mortise side walls [**Photo F**], tenon shoulders, dovetails, or even small miters [**Photo G**], use hand force only to drive the chisel forward, removing no more than 1/32" at a time. Again, always clamp the workpiece; never hand-hold it.


**Pare accurate miters,** such as this bead for a frame-and-panel door, using a guide block. Take narrow, overlapping passes to remove the waste.



**For control and power** hold the chisel in-line with the forearm, with the butt of the handle nestled in the meaty end of your palm.

**With a modified chopping grip,** lean forward and bend your knees to transfer your body weight to the chisel. Then make a series of light cuts.



**Create the slicing cut** by using your guide hand to assist in the pivoting motion.

**A chisel makes an effective scraper** when you angle the handle toward you and exert light downward pressure.

For best results, use a classic paring grip [**Photo H**]. When paring tasks call for extra downward pressure, such as cleaning up tenon shoulders, try a modified chopping grip, with your thumb over the end of the chisel handle, using your other hand to guide the blade [**Photo I**].

**3 Slicing** Use this method to cut pegs, dowels, or other projections flush with surrounding wood. Hold the chisel in a paring grip and use the other hand to hold down and pivot the chisel [**Photo J**]. Again, don't try to remove too much at one time.

**4 Scraping** A sharp chisel works great for cleaning up glue or evening up surfaces in tight areas. Hold the chisel handle with a modified chopping grip and use your other hand to pull the chisel blade toward you—hold the blade low to prevent chatter [**Photo K**].

# Modern Armchair & Footstool

*Comfort and style combined*

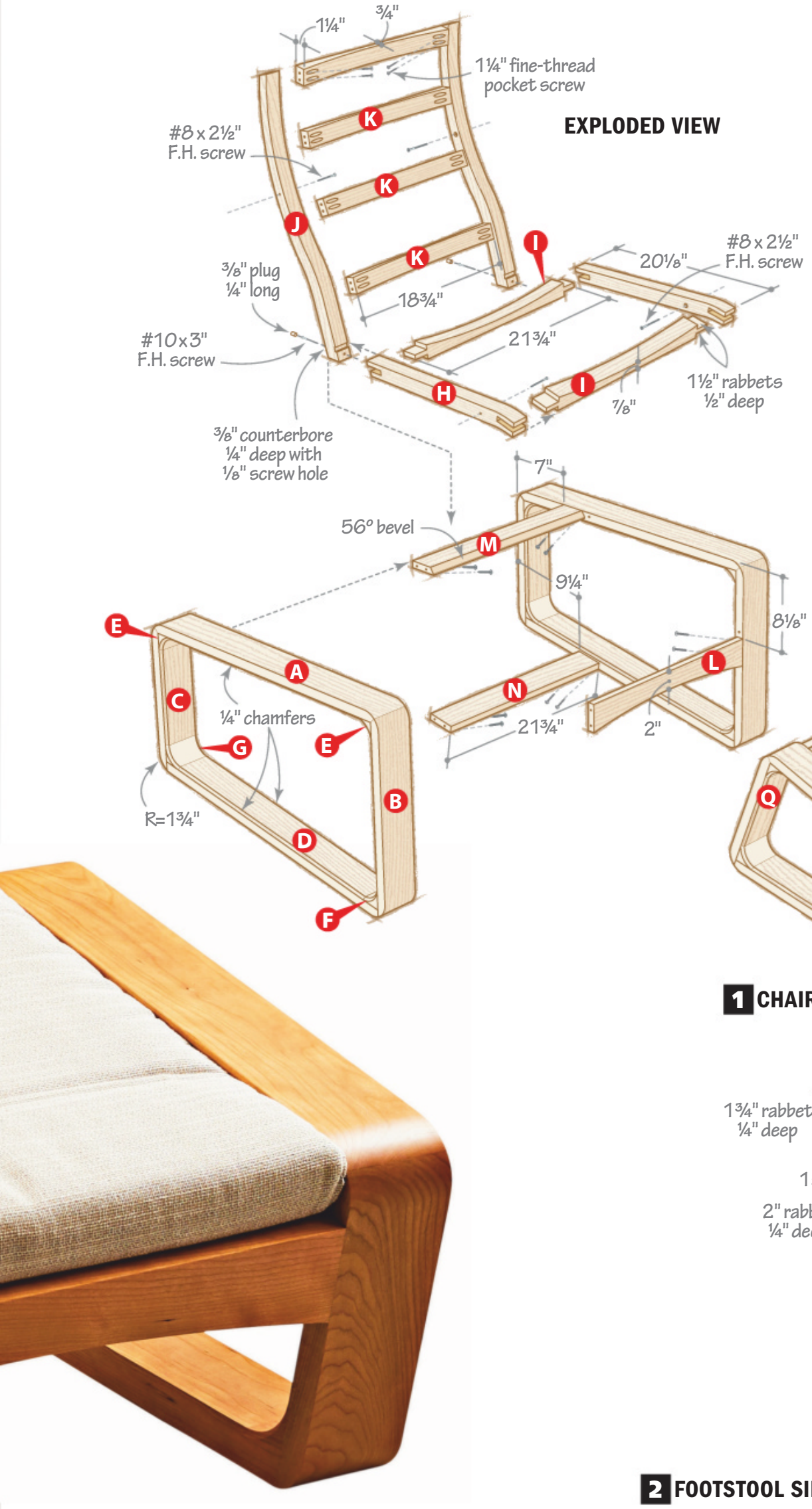
**DIMENSIONS:**
29¼" W × 34½" D × 34⅜" H

Approximate materials cost:
**$425**
With ready-made cushions

Footstool measures
29¼" wide
21½" deep
14" tall

While you'll admire this gorgeous cherry pair for their echoes of sleek mid-century modern style, lounging in the chair and putting your feet up reveals their most winning quality: comfort.

Rounded corners and sculpted rails add a bit of complexity, but our instructions and full-size patterns help you build this pair easily. And ready-made cushions [**Source**] make upholstery a cinch.




**Note:** *To create a continuous grain pattern over the legs and arms/tops, cut parts from one board for each chair and footstool side in B, A, C and Q, O, P order. You can cut the feet (D, R) from any board.*

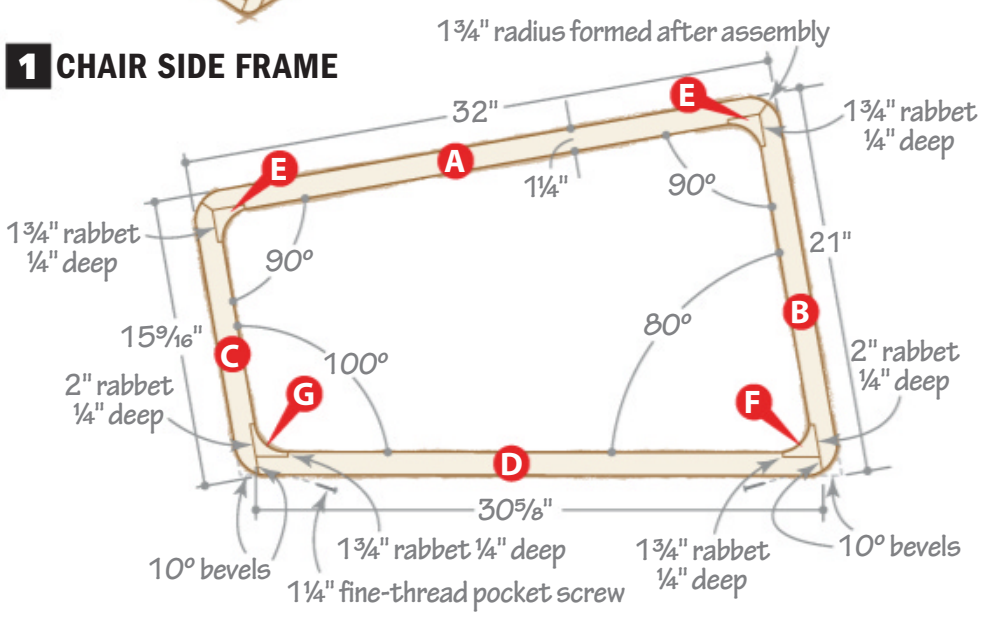
## Start with the side frames

The corner joinery, with inset corner reinforcing blocks, makes the side frames for the chair and footstool the most involved aspect of construction. We cut and machined parts for both the chair and footstool sides at the same time because they employ the same setups. Then, we set aside the footstool parts to assemble later.

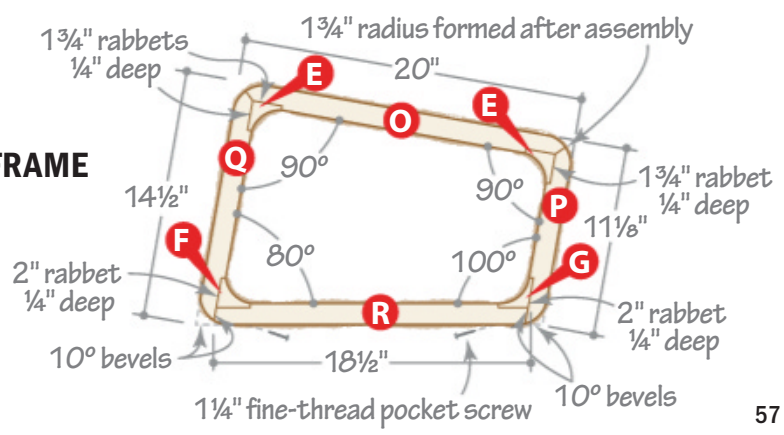
**1** Cut to size parts A–D for the chair sides and O–R for the footstool sides [**Drawings 1** and **2**, **Materials List**].

**2** Miter-cut at 45° both ends of the chair arms (A) and footstool tops (O), and the top ends of the front and back legs (B, C, P, Q) [**Drawings 1** and **2**]. Miter-cut the leg bottom ends and both ends of the feet (D, R) at 10°.

**1 CHAIR SIDE FRAME**




**2 FOOTSTOOL SIDE FRAME**



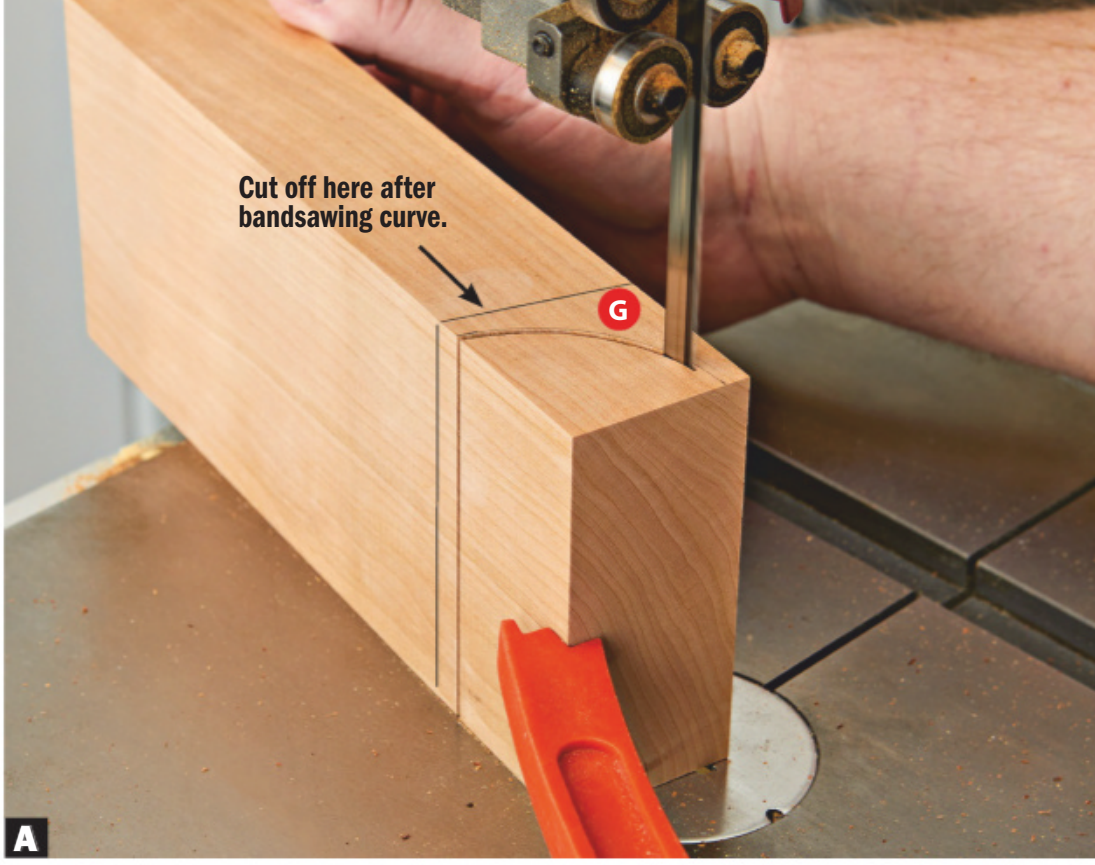
3 Cut the corner blocks (E–G) to shape [**Full-size Patterns, Photo A**] from overlength blanks. (We made three 1¾×3¾×15" blanks. After cutting, trim the top edges of blocks F and G to 90° with the back.

4 Dry-assemble the 90° corners (A/B, A/C, O/P, O/Q) and scribe the 90° corner blocks (E) onto them [**Photos B** and **C**].

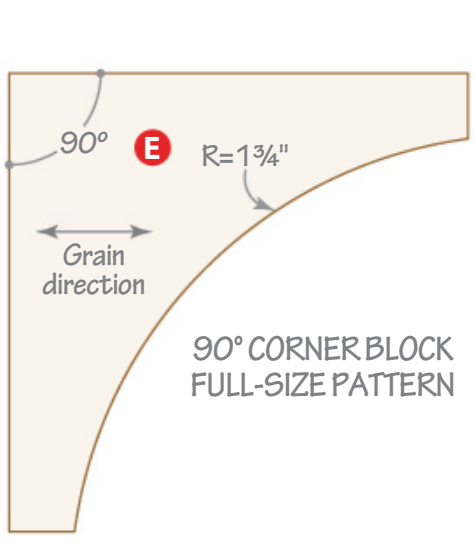
5 Rabbet the 45° miter-cut ends of parts A–C and O–Q where marked [**Drawings 1** and **2, Skill Builder**].

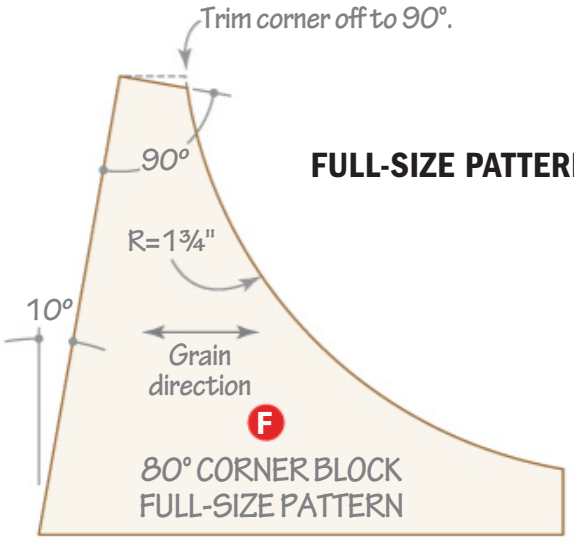
***Tip!*** *Tape the dry-assembled joints together while fitting the corner blocks.*

***Tip!*** *With the blade already tilted to 10° for bevel-cutting parts D and R, cut the 80° corner blocks (F) on the left side of the blade and the 100° blocks (G) on the right (assuming a left-tilting blade). Return the blade to 0° to cut the 90° blocks (E).*

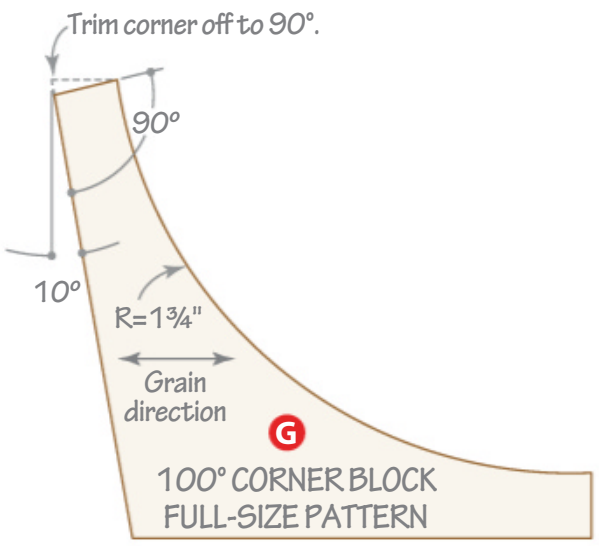



**Bandsaw the corner curves,** sand each curve to 220 grit, then crosscut the corner blocks to length on the tablesaw.




**FULL-SIZE PATTERNS**




# SKILL BUILDER

## Paring rabbets fits corner blocks precisely

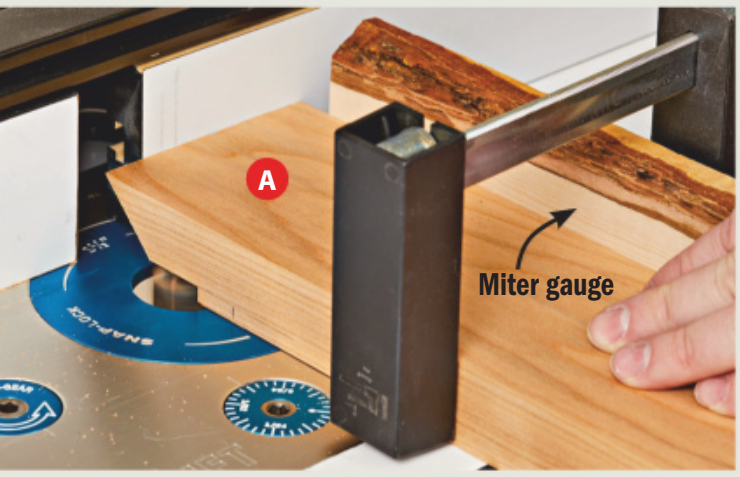
Routing renders perfect rabbets for the chair and footstool sides [**Photo** *below*], but trying to guide the router precisely to the marked shoulder line invites error and poor fit. The solution: Rout the rabbet to final depth, but stop just shy of the scribed shoulder line. Then pare to the line to finish the rabbet.

Paring off whisper-thin shavings allows you to fit each rabbet and corner block precisely.

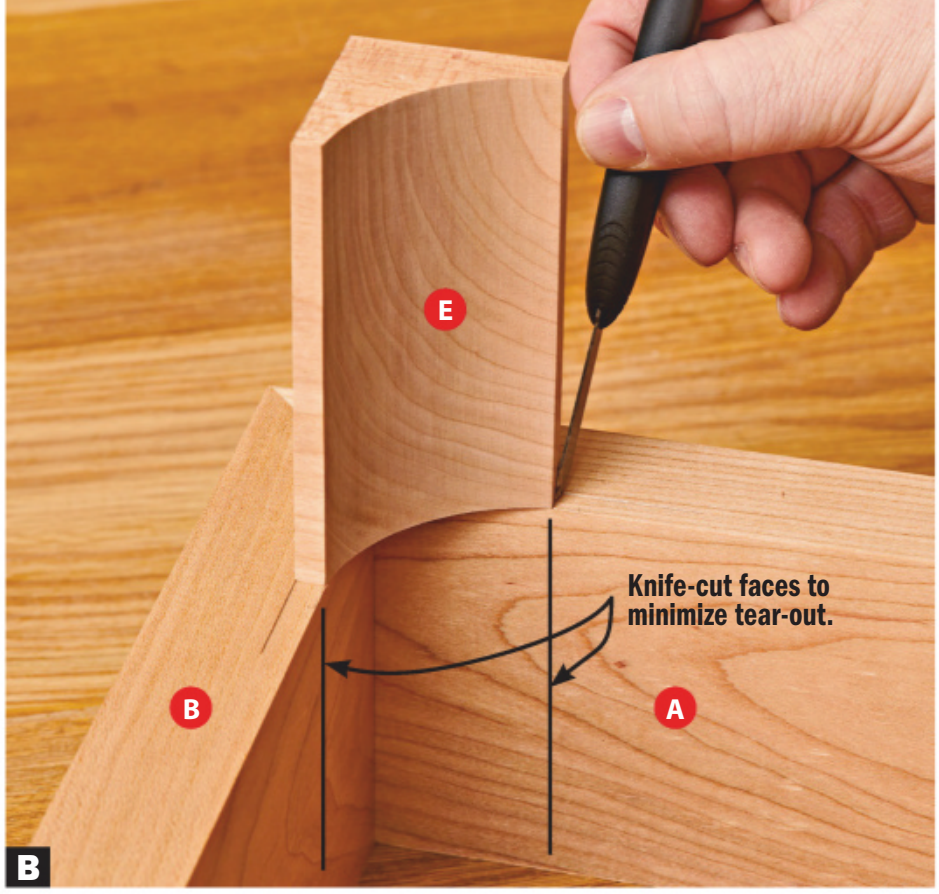
A shoulder plane [**Photo** *below center*] makes quick work of paring, if you have one (or have been looking for an excuse to buy one). Otherwise, rely on a wide chisel and a simple saddle guide [**Photo** *below right*].

Make the scrapwood saddle to fit snugly over the project parts, ensuring that the end is true and square to the workpiece surface. Hold the back of the chisel firmly against the guide.

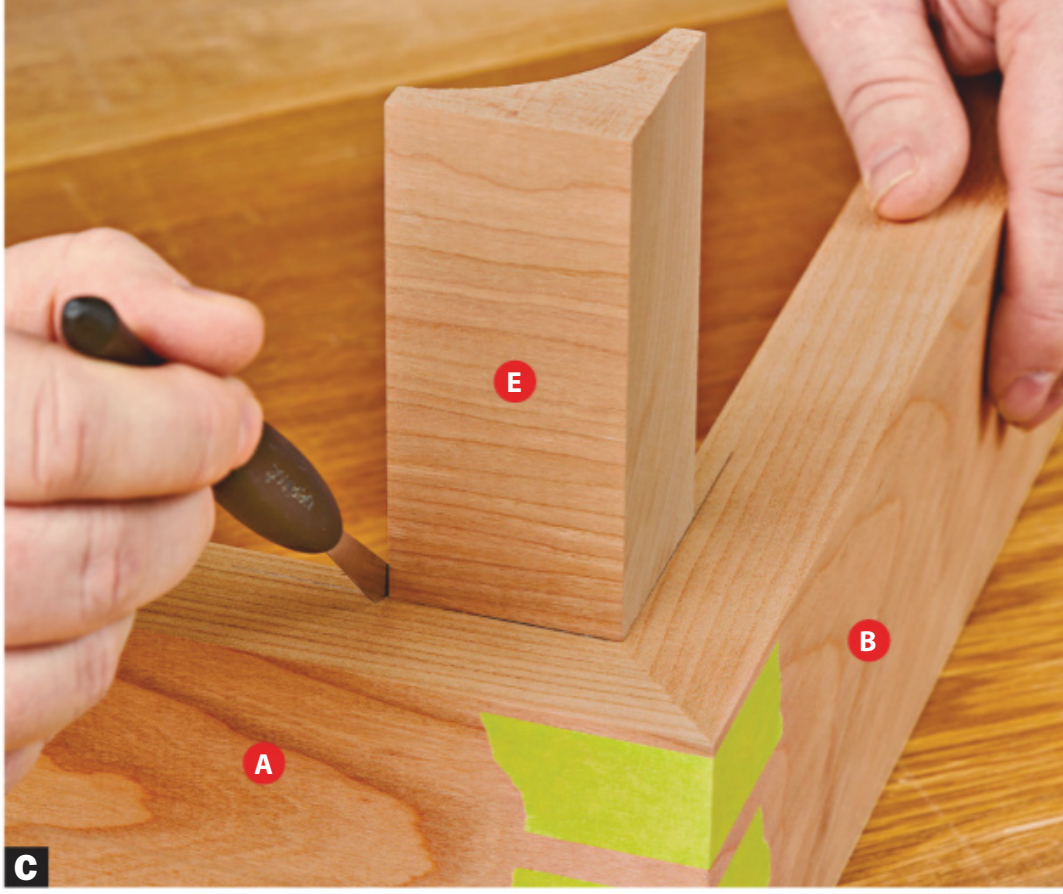
▶Watch a video about shoulder-plane use.
woodmagazine.com/shoulderplane




**A router table with a 1" straight bit** rabbets the miter joints accurately and cleanly. Test-cut scrap-wood to verify the rabbet depth first.

B



C

**Align the corner block (E) with the inside faces** of the A/B joint [**Photo B**]. Scribe the back and ends of the block on the arm (A) and leg (B) with a marking knife for precision (**Photo C**). Similarly mark the A/C, O/P, and O/Q joints. Extend the knife cuts across the inside faces to avoid tear-out when rabbeting.

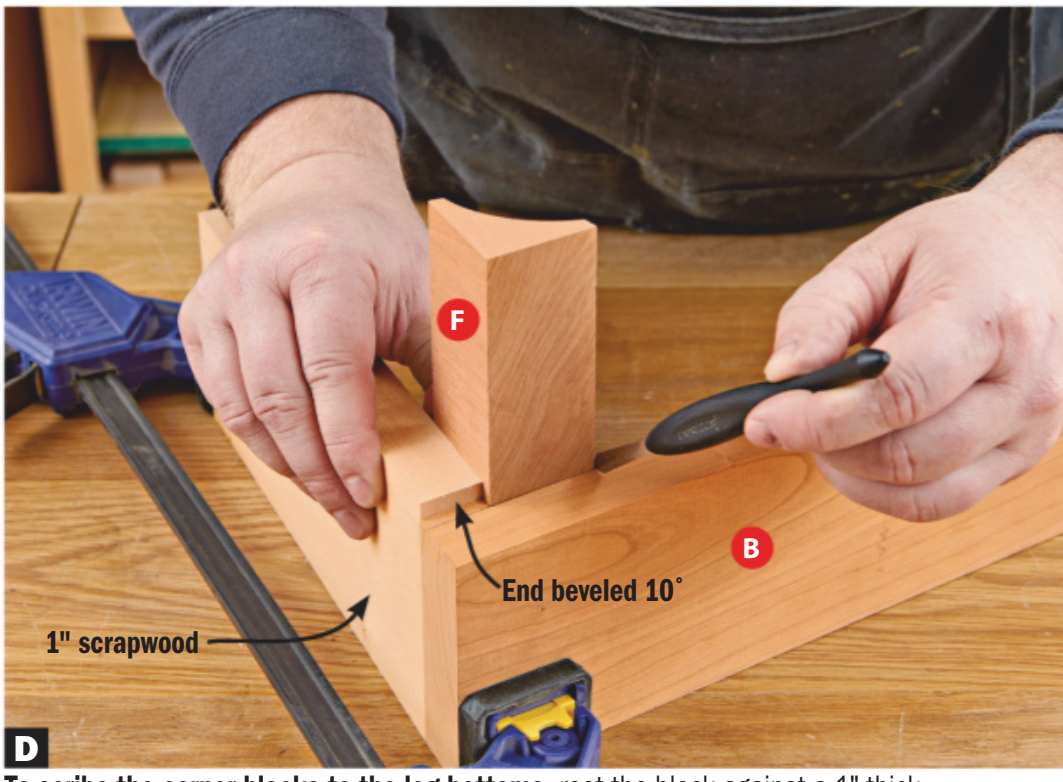
***Note:*** *After this step, set aside the footstool tops, legs, and feet (O–R), four E blocks, two F blocks, and two G blocks to assemble the footstool later.*

**6** Scribe the 80° corner blocks (F) to legs B and Q and the 100° blocks (G) to legs C and P [**Drawings 1** and **2**, **Photo D**]. Rabbet the leg ends on their inside faces.

**7** Dry-assemble a foot (D) and leg (B) and scribe the location of block F on the foot [**Photos E** and **F**]. Similarly, dry-assemble and mark the other B/F/D joint and the C/G/D, Q/F/R, and P/G/R joints. Rabbet the foot (D, R) ends [**Drawings 1** and **2**], and drill pocket holes in the underside of the feet.

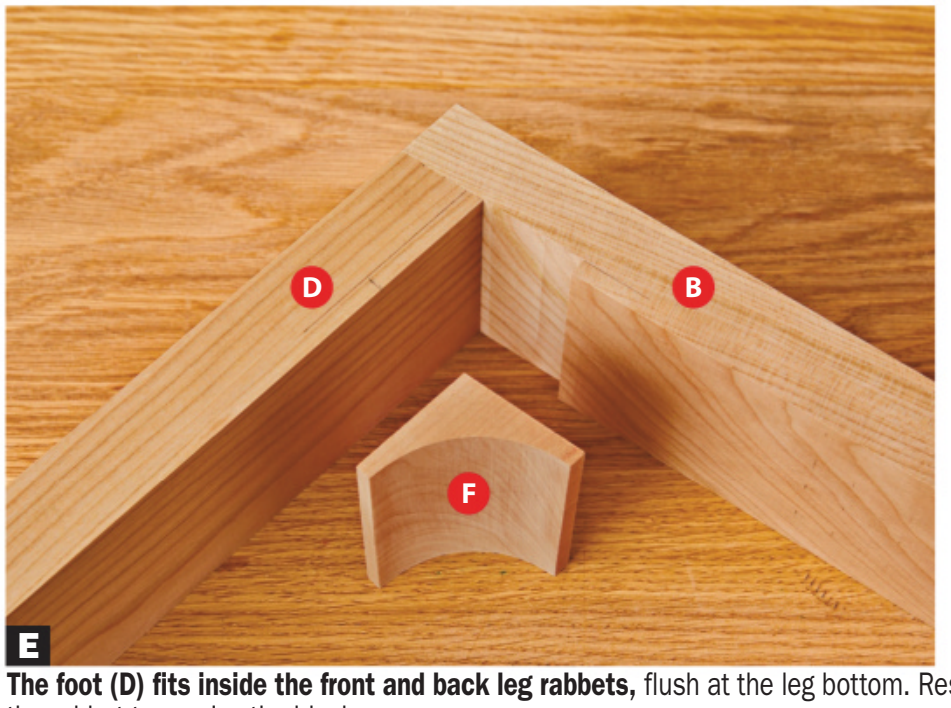
**8** Glue together the 90° corners (A/B/E and A/C/E) for each chair frame. After those joints dry, glue the leg/foot joints (B/F/D and C/G/D). After the glue dries, drive pocket screws into the foot/leg joints.

**9** Bandsaw and sand the radius on each outside corner [**Drawings 1** and **2**], and chamfer the inside edges [**Exploded View**]. Finish-sand the sides to 220 grit.

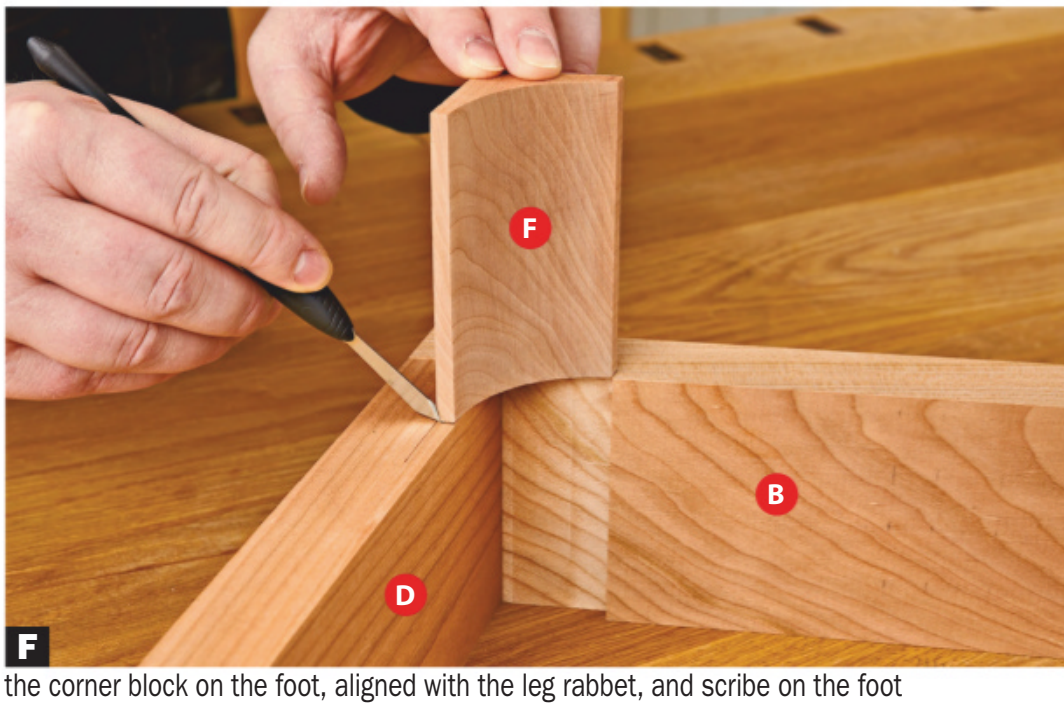


D

**To scribe the corner blocks to the leg bottoms,** rest the block against a 1"-thick scrap placed against the inside face of the leg and flush with the bottom.



E



F

**The foot (D) fits inside the front and back leg rabbets,** flush at the leg bottom. Rest the corner block on the foot, aligned with the leg rabbet, and scribe on the foot the rabbet to receive the block.

## Take a seat

1 Lay out the seat sides (H) [**Full-size Pattern**] on 1½×2×24" blanks and bandsaw them to shape. Bandsaw the bridle joints [**Photo G**] and clean up the ends with a chisel.

2 Cut the seat spreaders (I) to size. Form tenons on the ends [**Exploded View**] to fit the bridle joints in the sides (H). Bandsaw the curved tops of the spreaders.

3 Bevel the lower back edge of one seat spreader [**Photo H**].

4 Glue together the seat sides (H) and spreaders (I), with the beveled spreader at the back. Square the assembly. When dry, trim the back corners to 10° [**Photo I**]. Finish-sand the seat assembly.

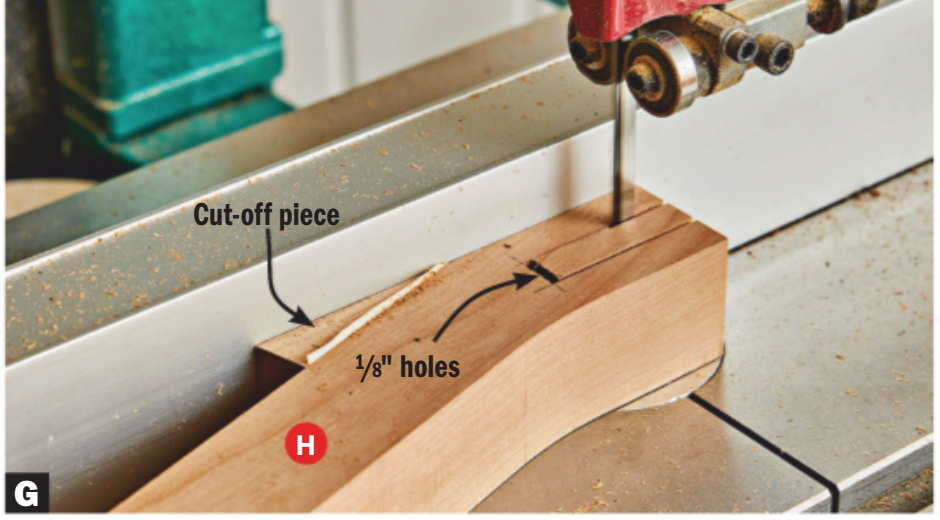
5 Lay out the backrest sides (J) [**Gridded Pattern**] on 1½" stock. Bandsaw to shape, cut notches to fit over the joint tops on the seat side rails (H) [**Photo J**], and sand smooth.

6 Glue the backrest sides (J) to the seat assembly (H/I) [**Exploded View**]. After the glue dries, drill a counterbored screw hole through each side (J) into the side rails (H), and drive screws.

7 Cut to size the backrest spreaders (K). Bandsaw the curve in each [**Exploded View**] and drill pocket holes in the ends.

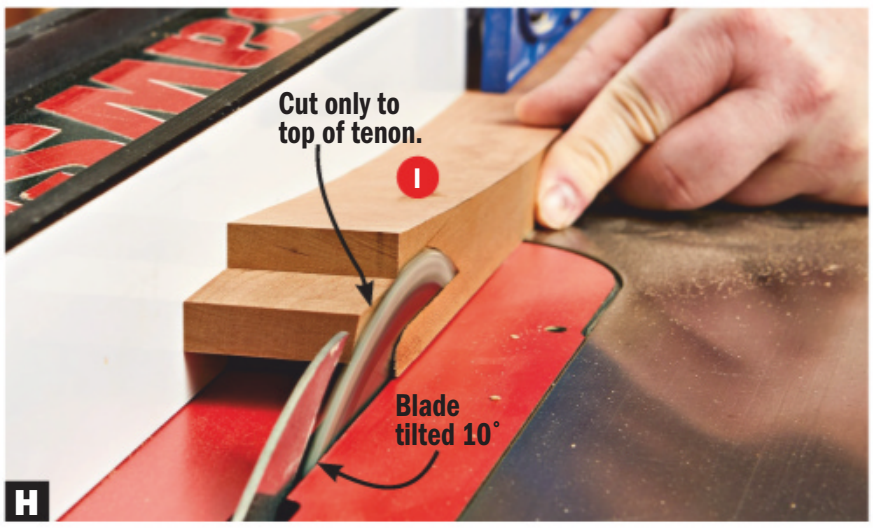
8 Screw the spreaders to the backrest sides. Glue wooden plugs into the pocket holes and counterbores, and sand them smooth. Finish-sand the seat and backrest assembly (H–K). Apply several coats of wiping finish. (We applied three coats of Danish oil.)

9 Staple a double layer of 10-oz. duck canvas to the seat and backrest (H–K) top surfaces to support the cushion.



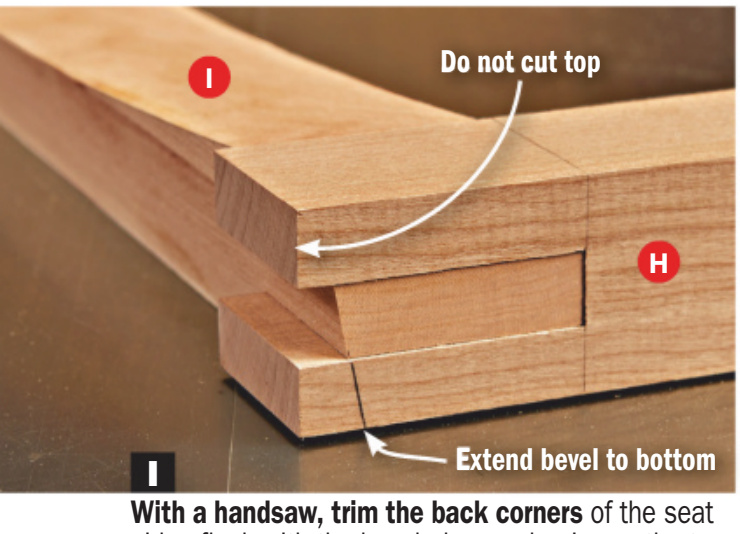

**Fasten the cut-off piece to the side (H)** with double-faced tape to stabilize the curved end when cutting the bridle joint.

***Tip!*** *Drill a series of overlapping ⅛" holes at the end of the bridle joint before bandsawing the joint cheeks.*

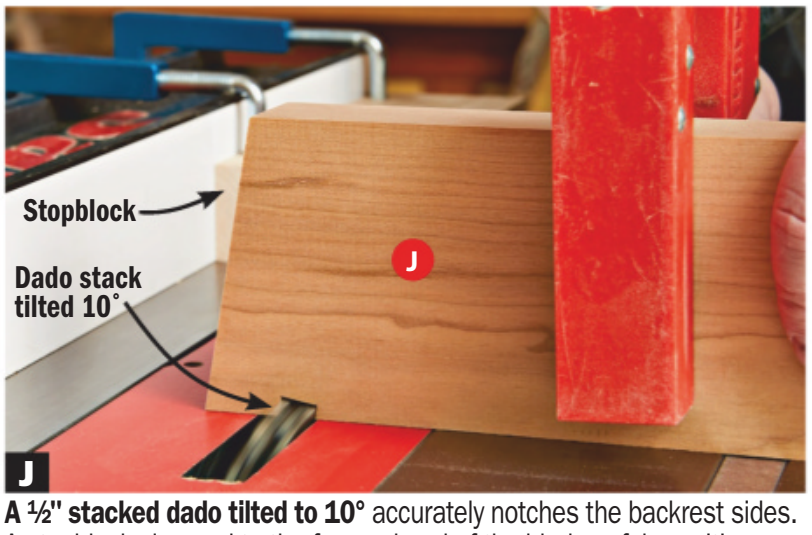



**Tilt the tablesaw blade to 10°** to bevel the spreader. Cut the bevel only to the tops of the tenons, leaving the back face flat above the tenons.

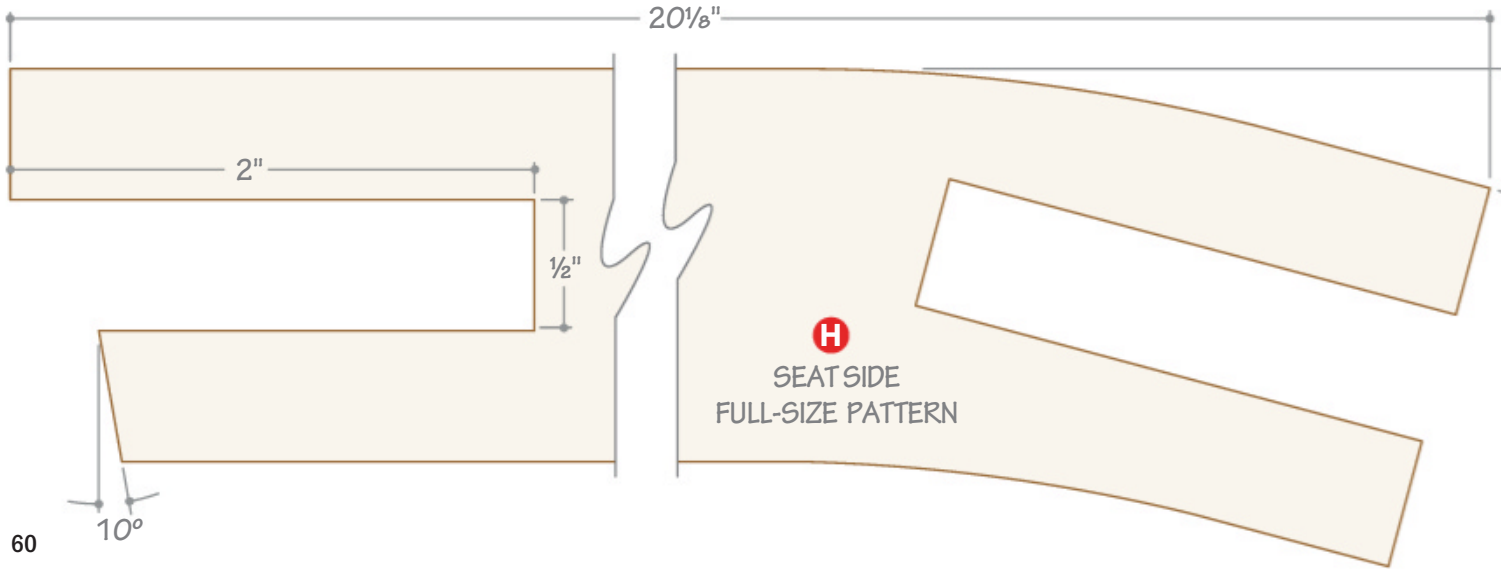
▶Enlarge gridded patterns without a photocopier. woodmagazine.com/enlargeplans

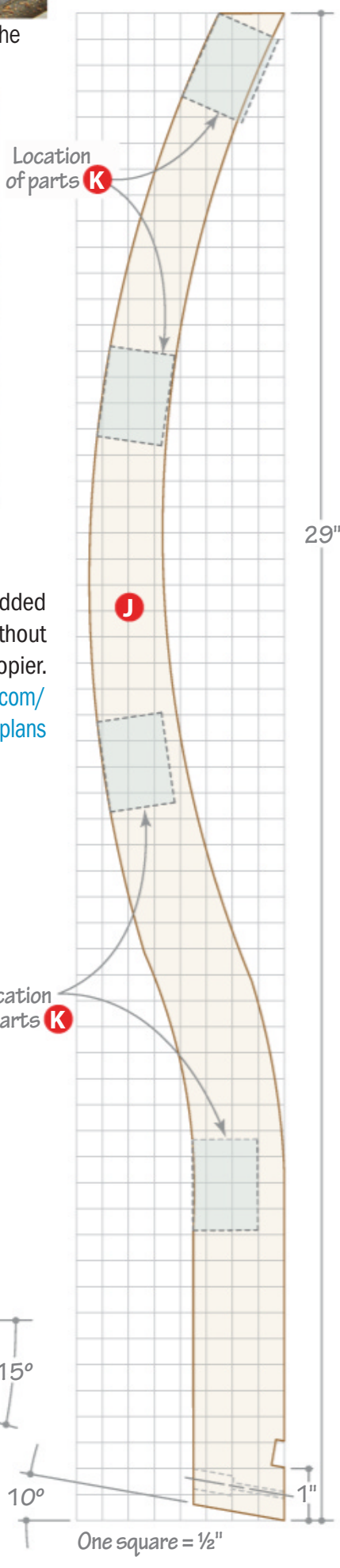



**With a handsaw, trim the back corners** of the seat sides flush with the beveled spreader. Leave the top tongue as is.




**A ½" stacked dado tilted to 10°** accurately notches the backrest sides. A stopblock clamped to the fence ahead of the blade safely positions each rail for precise cutting.



## Put the chair together

1 Cut to size the front/back, top, and bottom rails (L–N) [**Exploded View**]. Cut the curved bottom edge on the front/back rails (L). Set two of them aside for the footstool.

2 Bevel-rip the front edge of the top rail (M) [**Exploded View**]. Drill pocket holes in the rails, and finish-sand.

3 Glue and clamp the rails between the side assemblies (A–G) [**Exploded View**]. Drive in the pocket screws and plug the holes. Finish-sand, and apply finish to the chair frame.

4 Place the seat/backrest assembly on the chair frame [**Exploded View**]. Clamp the seat/backrest to the frame on both sides, and sit down in it. Adjust the position for comfortable seating.

5 Screw the seat/backrest to the chair frame. (We decided not to plug the screw holes, to allow for adjusting the chair later.)

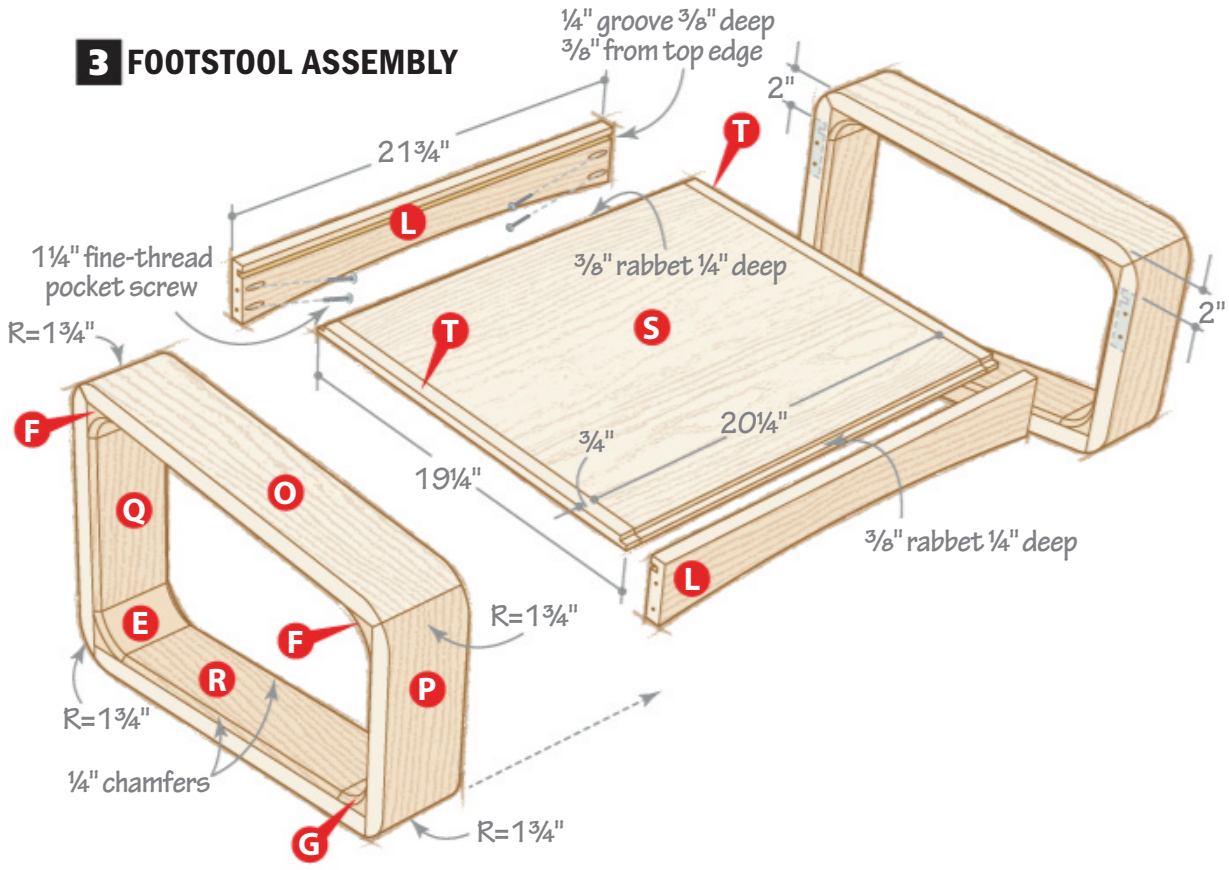
## Finish the footstool

1 Retrieve side parts O–R and the corner blocks. Assemble the frames [**Drawing 2**] as you did the chair frames.

2 Cut the panel (S) and edging (T) to size. Glue the edging to the panel [**Drawing 3**] and rabbet the long edges.

3 Groove the rails (L) and drill pocket holes in them. Glue and clamp the rails to the panel assembly (S/T).

**3 FOOTSTOOL ASSEMBLY**

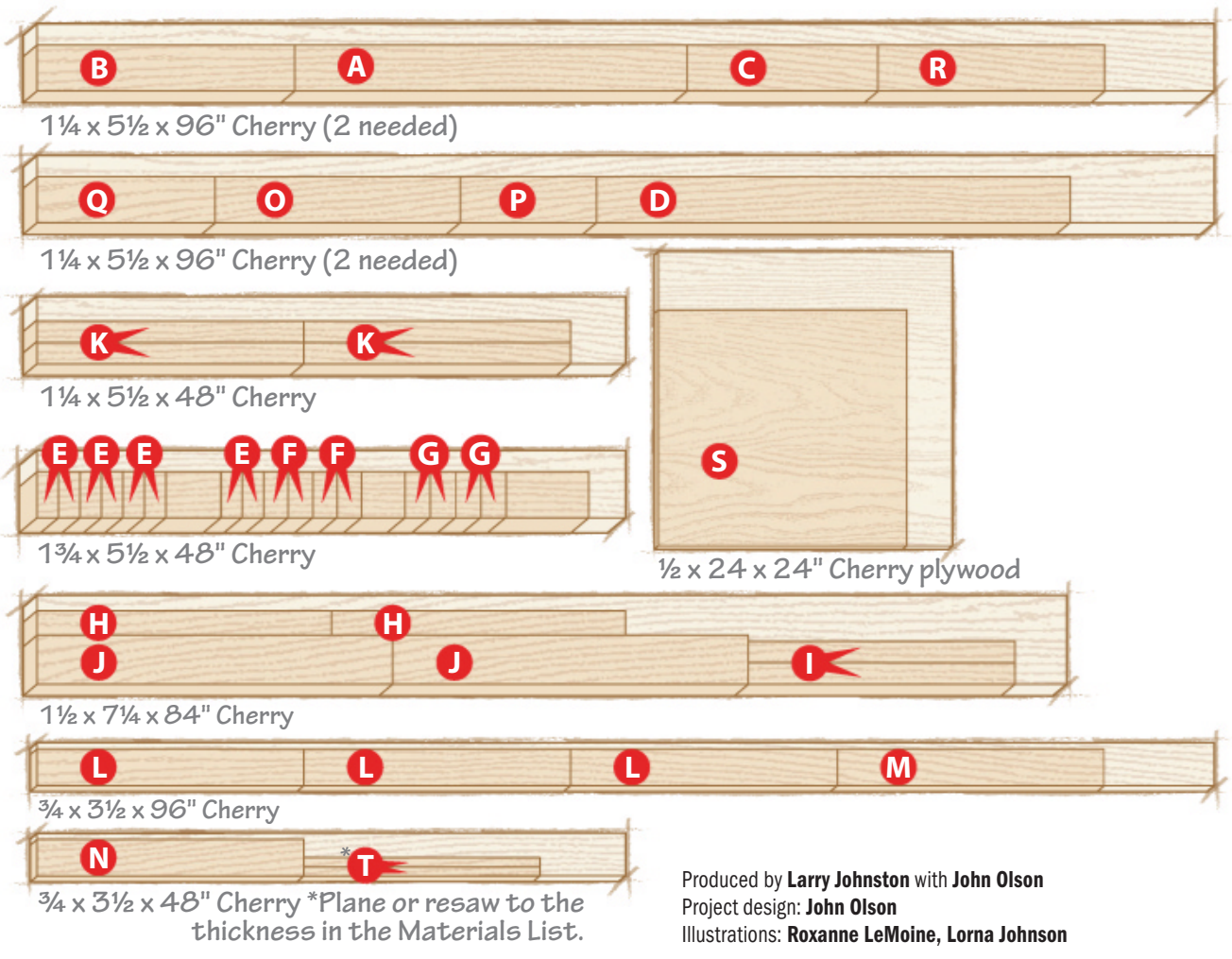



4 Glue and clamp the panel assembly (L/S/T) between the side frames. Drive pocket screws, and plug the holes.

5 Lay the cushions [**Source**] on the seat and backrest and footstool. Set the footstool in front of the chair with the tall side facing the chair. Sit down, put your feet up, lean back, and take it easy—you've earned it.

## Cutting Diagram

This project requires 14 board feet of 8/4 cherry , 30 board feet of 6/4 cherry, and 4 board feet of 4/4 cherry.





Produced by **Larry Johnston** with **John Olson**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**


## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| **Chair side frames** | | | | | | |
| A | arms | 1¼" | 3¾" | 32" | C | 2 |
| B | front legs | 1¼" | 3¾" | 21" | C | 2 |
| C | back legs | 1¼" | 3¾" | 15⁹⁄₁₆" | C | 2 |
| D | feet | 1¼" | 3¾" | 30⅝" | C | 2 |
| E* | 90° corner blocks | 1¾" | 3¾" | 1¾" | C | 8 |
| F* | 80° corner blocks | 1¾" | 3¾" | 2" | C | 4 |
| G* | 100° corner blocks | 1¾" | 3¾" | 2¹⁄₁₆" | C | 4 |
| **Chair seat and rails** | | | | | | |
| H* | seat sides | 1½" | 1⅞" | 20⅛" | C | 2 |
| I | seat spreaders | 1½" | 1¾" | 21¾" | C | 2 |
| J* | backrest sides | 1½" | 3¾" | 29" | C | 2 |
| K | backrest spreaders | 1¼" | 1¾" | 18¾" | C | 4 |
| L | front/back rails | ¾" | 3" | 21¾" | C | 3 |
| M | top rail | ¾" | 3" | 21¾" | C | 1 |
| N | bottom rail | ¾" | 3" | 21¾" | C | 1 |
| **Footstool** | | | | | | |
| O | tops | 1¼" | 3¾" | 20" | C | 2 |
| P | front legs | 1¼" | 3¾" | 11⅛" | C | 2 |
| Q | back legs | 1¼" | 3¾" | 14½" | C | 2 |
| R | feet | 1¼" | 3¾" | 18½" | C | 2 |
| S | top panel | ½" | 19¼" | 20¼" | CP | 1 |
| T | panel edging | ½" | ¾" | 19¼" | C | 2 |

*Parts initially cut oversize. See the instructions.

**Materials key:** C-cherry, CP-cherry plywood.

**Supplies:** #10×3" flathead screws, #7×1¼" fine-thread pocket screws, #8×2½" flathead screws, ⅜" cherry plugs, cherry pocket-hole plugs, 10-oz. duck canvas, staples.

**Blade and bits:** Dado set; 45° chamfer router bit; ⅜" plug cutter.

**Source:** Poang chair cushion, fabric or leather, various colors, from $50, Poang ottoman (footstool) cushion, from $10, ikea.com.

# Candle Power

*Figured and contrasting woods turn this easy build into a stunning centerpiece.*

Candles in a decorative holder always liven up a table and add to your home's overall decor. Use this project to show off some figured or exotic wood you've been saving, such as the quilted maple, *above*. You'll learn how to cut splined miters and wedged mortise-and-tenon joints, both of which you can apply to future furniture projects! We also provide an inexpensive source for the candleholders.

**DIMENSIONS:** 15¾" W × 6" D × 6" H

**Approximate materials cost:** **$40** (including holders, but not candles or other decor)

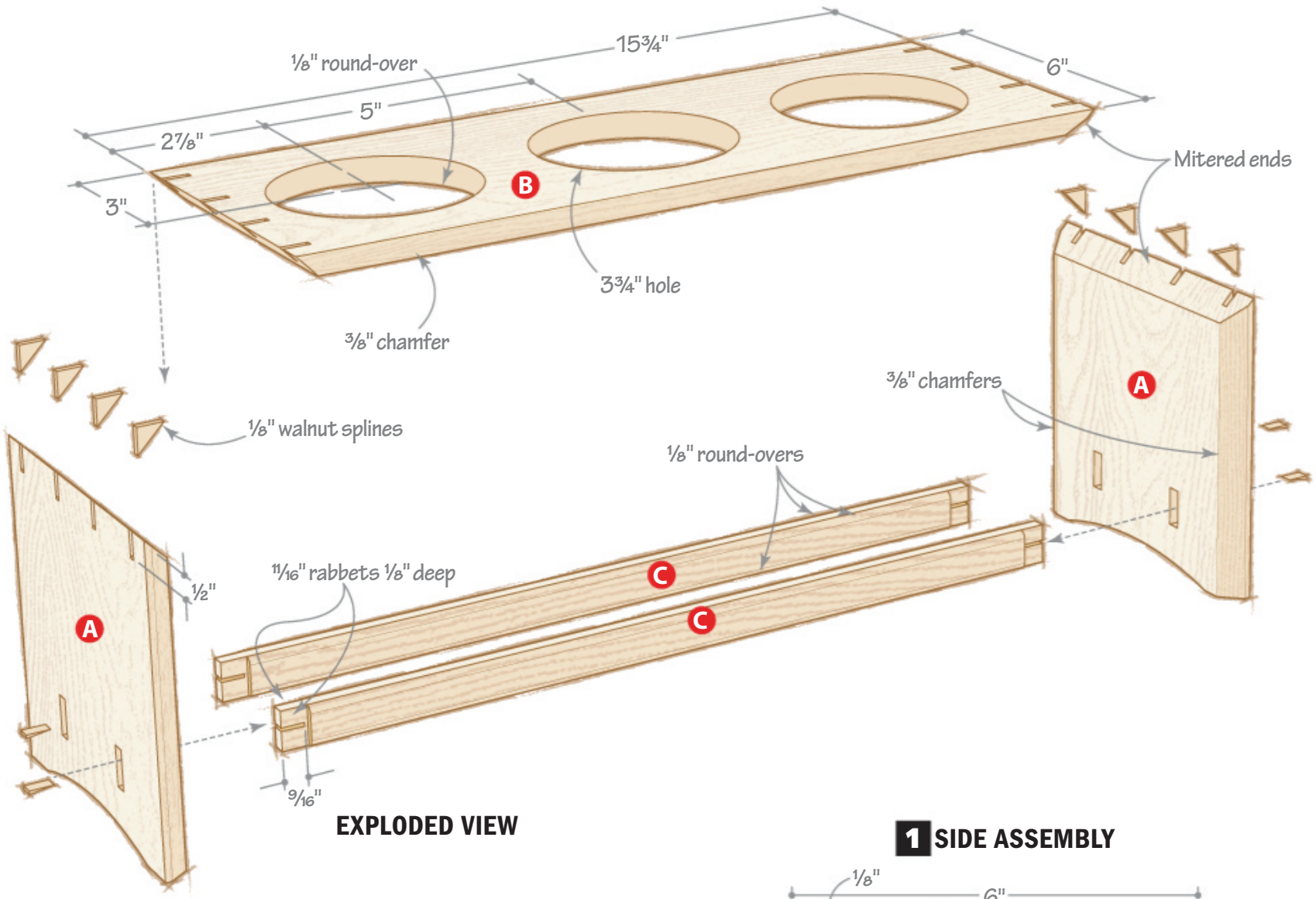
## Endless options for the candle vase contents

Cylinder vases are a great foundation for creating unique centerpieces that you can change out for the seasons or different rooms in your home. The vases can be filled with anything from silk flowers, to candles, to your favorite seasonal items! We used river stones and fine sand for the example at *left*, and sea glass, *above*, for another option. Your choices are endless.

## Construct the base elements

1 Cut a ⅝×6×30" maple blank to size. Mark the center of the workpiece, and then lay out the locations for the miter-cut ends of the sides (A) and top (B) [**Exploded View**]. Lay out the hole locations and draw the circles with a compass.

2 Make a circle-routing jig from a ¼×7×10" piece of hardboard. Lay out a 3¾" hole 3" from one edge and centered lengthwise. Cut out the hole and sand it smooth using a spindle sander. Glue a ¾×1×10" cleat flush




**EXPLODED VIEW**

along the template edge farthest from the hole (with the 1" face glued to the template).

**3** Elevate the workpiece on risers and clamp it to the workbench. Cut and rout the holes to shape [**Photos A, B**].

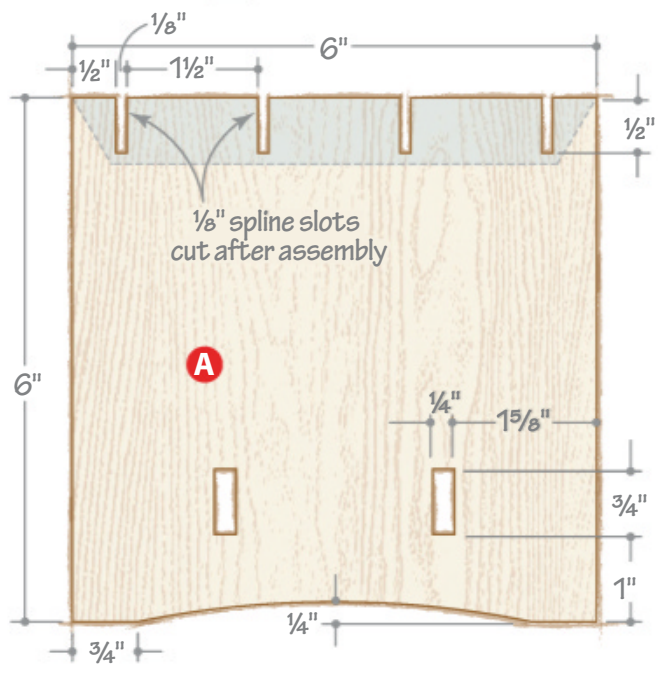
**4** Miter-cut the top (B) to final length [**Exploded View**]. Miter-cut the sides (A) where you just cut away the top, so the grain "flows" across the joint, mimicking a waterfall. Crosscut the sides to length.

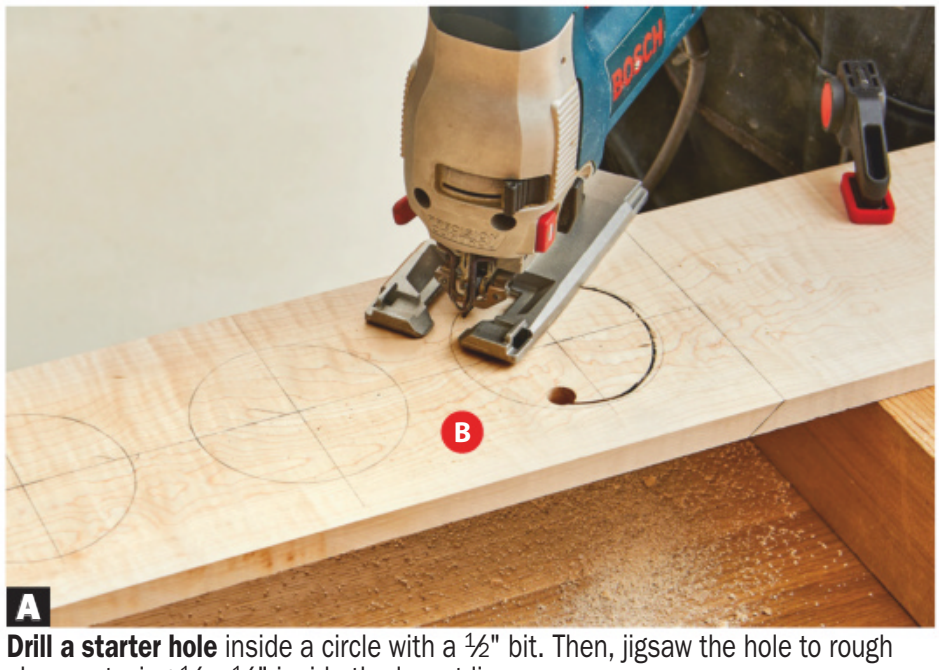
**5** Chamfer the edges of the top and sides [**Exploded View**]. Round over the bottom of the holes.

**6** Cut and sand the arch on each side (A) [**Drawing 1**].

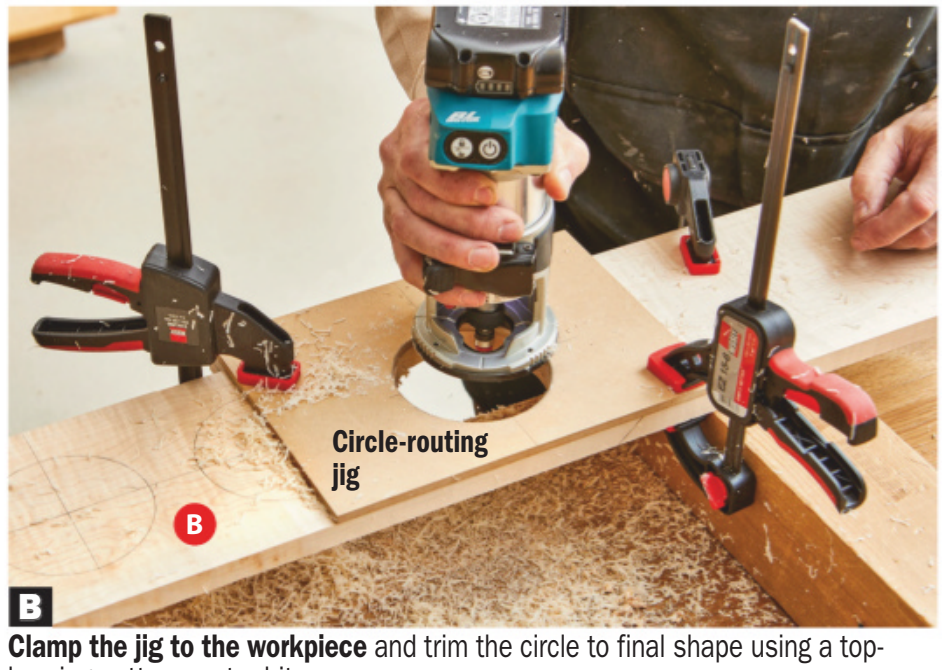
▶ Build and use a fairing stick to lay out the arch on the sides. woodmagazine.com/fairing

**1 SIDE ASSEMBLY**




**Drill a starter hole** inside a circle with a ½" bit. Then, jigsaw the hole to rough shape, staying 1/16–⅛" inside the layout line.




**Clamp the jig to the workpiece** and trim the circle to final shape using a top-bearing pattern router bit.


C

**Clamp a guide with a square edge to the side** aligned with the mortise layout line. Rest the back of a chisel against the guide and pare the walls of the mortise to size.


D

**Bandsaw a kerf into each tenon** to accept the wedge that will tighten the tenon's fit in the mortise.

***Note:*** *The shoulder-to-shoulder dimension of the rails (C) should precisely match the heel-to-heel dimension of the top (B).*

7 Lay out the mortises on the sides [**Drawing 1**]. Drill 7⁄32" holes within the mortise lines, and finish with a chisel [**Photo C**].

8 Cut the rails (C) 1⁄8" longer than listed [**Materials List, Exploded View**]. (They will protrude through the mortises after assembly. You'll trim them flush later.) Form and notch the tenons on each end of both rails, making sure they fit snugly in the mortises [**Photo D, Exploded View**].

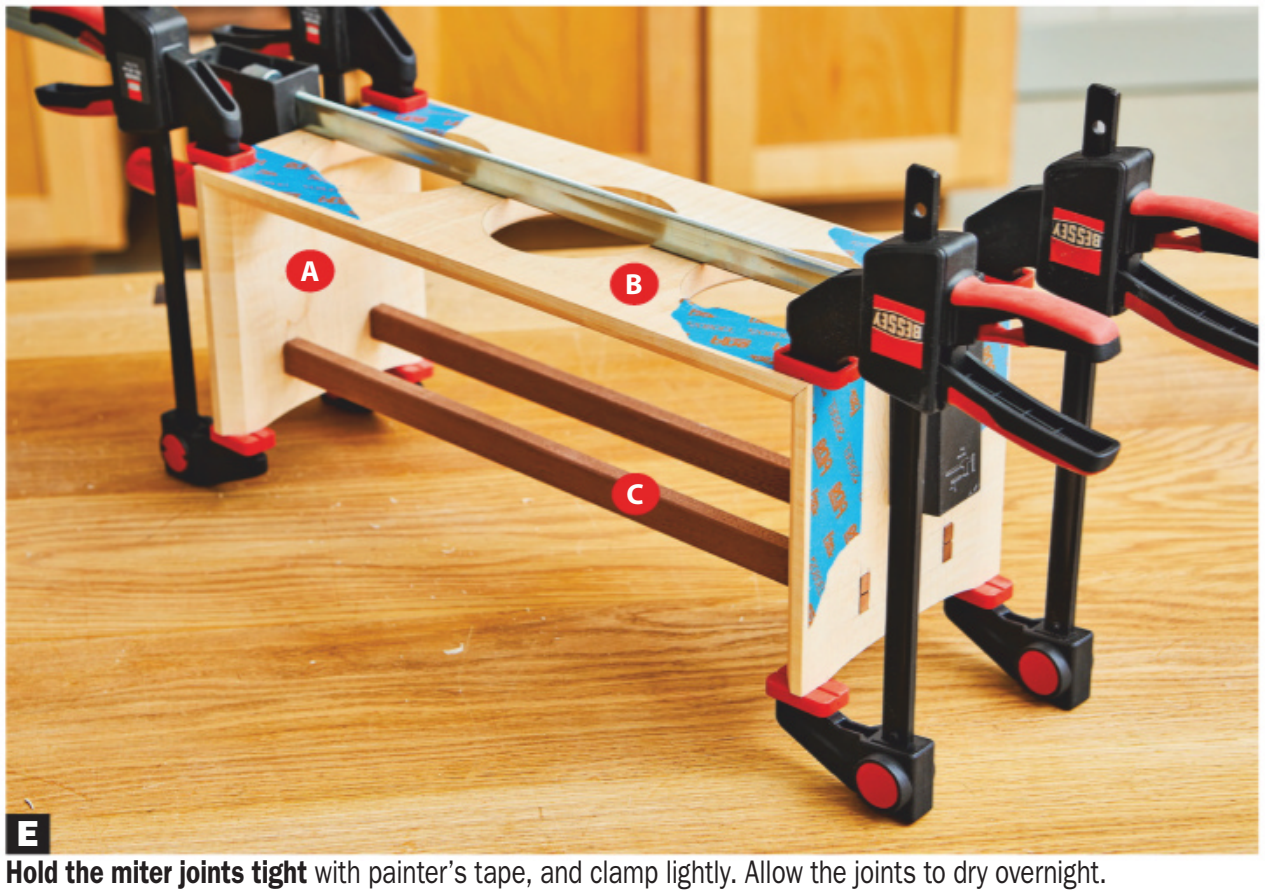
9 Round over the edges of the rails. Finish-sand the rails and inside faces and edges of the top and sides.

## Bring it all together

1 Apply glue to the miters on the sides (A) and top (B), place the rails in the mortises unglued, and clamp together [**Photo E**].

2 Cut 1⁄4"-wide, 5⁄8"-long maple wedges, slightly thicker than the kerf in the tenons. These wedges should taper slightly to spread the tenons as they seat. Apply glue in a kerf, and drive a wedge until it gets snug—then stop! Driving it too deep will split the rail. Repeat for the other joints.

3 Plane and sand the rails and wedges flush with the sides.




E

**Hold the miter joints tight** with painter's tape, and clamp lightly. Allow the joints to dry overnight.

## Add decorative splines

1 Build the slot-cutting jig [**Drawing 2**]. Raise the blade 1" above the table. Ensure the blade won't cut through the inside of the joint. Position the jig against the rip fence, and adjust the fence to align the blade to cut the slot nearest the fence [**Photo F, Drawing 1**]. Cut a slot near each corner. Flip the project around and cut two more slots. Reposition the fence to the second set of four slots.

2 Rip two walnut spline strips from a ¾"-thick, 12"-long blank, testing the fit until it snugly fits in a slot.

3 Cut each spline strip into 1"-long pieces. Glue the splines into the slots, making sure they seat fully in the bottom of each slot. When dry, trim flush, and finish-sand the top and sides.

4 Apply a finish. We sprayed our candleholder with two coats of Deft lacquer (satin sheen), sanding after each coat with a 320-grit sanding sponge.

5 Insert glass vases [**Source**] in the assembly, add candles (or other decorative items to suit your taste), and then sit back and admire your handiwork.

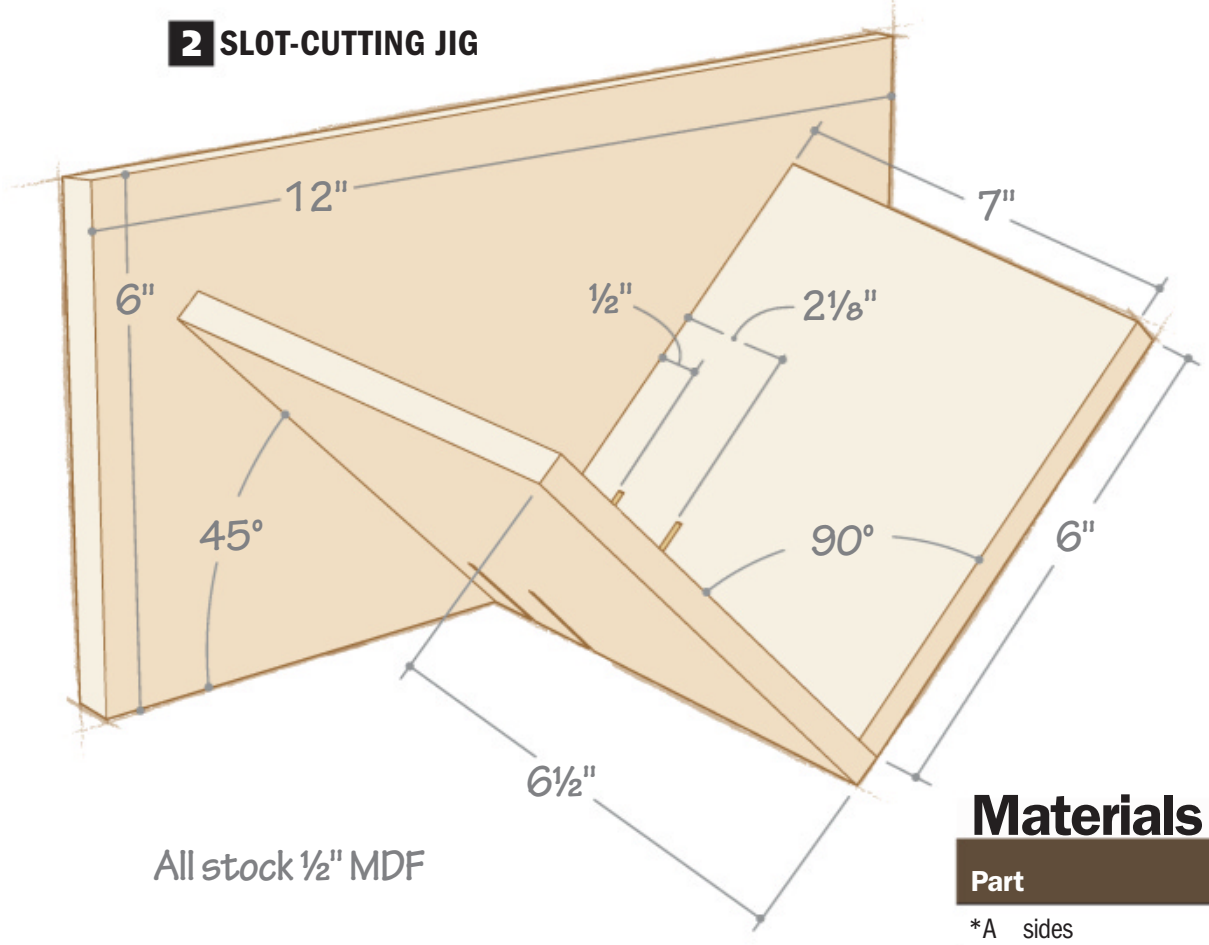
***Tip!*** *Use a full-kerf (⅛") rip blade to cut the spline slots. The flat-top teeth create slots with precise square corners. Any other blade will likely leave slots with unsquare corners.*

▶To watch a video showing how to cut the spline slots, point your smartphone's camera at this code—no app required—or visit woodmagazine.com/splineslots.

**F**

**With the candleholder nestled in the jig** and against its fence, cut a slot. Do not slide the jig back across the blade; instead, lift it over or slide it around the blade. Reposition the candleholder and cut the remaining slots.

**2 SLOT-CUTTING JIG**




All stock ½" MDF

## Materials List

| Part | | FINISHED SIZE T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|---|
| *A | sides | ⅝" | 6" | 6" | M | 2 |
| *B | top | ⅝" | 6" | 15¾" | M | 1 |
| *C | rails | ½" | ¾" | 15¾" | W | 2 |

*Parts initially cut oversize. See the instructions.

**Materials key:** M-maple, W-walnut.

**Bits:** 45° chamfer, ⅛" round-over, and top-bearing pattern router bits.

**Source:** 3½×6" candle vases, no. 10266100, $6.49, Michaels, 800-642-4235, michaels.com.

Produced by **Bob Hunter** with **Kevin Boyle**
Project design: **John Olson**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

# The hot dish on Hide glue

***Here's how to make this centuries-old adhesive work for you.***

Imagine a scrap heap of once-great ideas and advancements, now tossed aside to fade into oblivion. Cassette tapes are over there, rotary-dial telephones down in front, and on top: tube tires for cars, the telegraph, and hide glue. Not so fast! Don't throw out hide glue just yet.

Even though it's been holding wood together for more than 5,000 years with little change in its formula—yes, it's still made from the collagen in cattle hides—hide glue still has a place in 21st-century woodworking. And, it has a few advantages that Johnny-come-lately adhesives can't offer. But, in all fairness to glues that come ready to use, hot hide glue does require more prep time and labor.

## Why seek hide?

Furniture built before the 1920s was typically joined with hide glue because that's all craftsmen had. And that furniture's longevity testifies to hide glue's ability to hold wood together. But modern glues hold well, too, so why should you use hide glue?

As you can see from the list below, hide glue has several advantages over synthetic yellow and white PVA glues and polyurethane glues. Should you ever need to take apart a joint—for example, loose chair legs and stretchers—simply soften the hide glue in the joints with warm water and lightly tap them apart with a mallet. For this reason, luthiers (makers of acoustic wooden musical instruments) use primarily hide glue when crafting their guitars and violins. Because of the stress and wear from vigorous playing, these instruments often need to be taken apart to repair internal components.

Here's another of hide glue's unique properties: It bonds to itself. You don't need to clean out old hide glue from a joint—which you must do with synthetics. Instead, the new hide glue you add to the joint dissolves the old glue and bonds with the wood. This proves especially helpful in hard-to-reach mortises and beneath buckled veneer.

Because hide glue comes in different grades (known as *gram strengths*), it also varies in open times. This allows you to pick the glue you want for each job, from almost instant tack (grade 379, for marquetry, intarsia, or hard-to-clamp pieces, where a minute of hand pressure does the trick) to as long as 3 minutes (135, for face frames or carcases with many parts). We suggest starting with grade 192, with about 2 minutes of open time, until you become familiar with hide glue and feel comfortable with quicker-setting grades.

And, a fully dried hide-glue joint packs the same strength and rack resistance as a similar joint bonded with synthetic glues. So there's no sacrifice in using hide glue.


Titebond's liquid hide glue proves as easy to use as its yellow PVA glues.

### Take a shortcut with liquid hide

Like the idea of hide glue but don't want to fuss with a hot pot and mixing ratios? Titebond's premixed Genuine Hide Glue comes ready to use, and works anywhere you'd use hot hide glue. It bonds with old hide glue to make furniture repairs, and it softens when wetted for disassembly. But with an open time of about 20 minutes, this glue won't give you the quick tack of high-grade hot hide glues. Bob Behnke of Franklin International (maker of Titebond) says its hide glue has a shelf life of 2 years and should be stored and used at room temperature.

## The sticky truth about hide glue

### Advantages:

- It is reversible, allowing disassembly of joints without damaging the wood.
- Bonds to old hide glue when regluing joints.
- As strong as modern-day synthetic yellow, white, and polyurethane glues.
- Multiple grades of glue provide progressive open times.
- You can extend its open time by adding salt. (See *next page*.)
- Glued joints don't creep (move after the glue has dried).
- Dry hide glue has unlimited shelf life; mixed glue can be reheated.
- Cleans up with warm water.

### Disadvantages:

- Water-based finishes could soften hide-glue joints.
- Must be mixed exactly to manufacturer specifications for different open times.
- Preparation time required (mixing, heating) before glue-up.
- High humidity can weaken joints made with liquid hide glue (not hot hide glue).
- Temperatures of the glue (135–145 degrees F), your shop, and workpieces (above 50 degrees for both, but warmer is better) need to be monitored for optimum glue-up conditions. Chilly boards suck the open time out of hot hide glue.


**Available in three forms,** dry hide glue sells in quantities from 1 pound to more than 50.

## Preparing hot hide glue

Hide glue comes in three dry forms: ground, flakes, and pearls, as shown *above*. They're the same glue once melted, and they cost the same. The only discernible difference: Ground glue, our choice, needs less time to soak before heating (about 30 minutes), while flakes require about an hour. Pearls can take 8 to 10 hours.

Mix the dry glue with cold water according to the manufacturer's instructions, then allow it to soak. When it achieves a lumpy, gelatinous consistency, heat the mixture in a double-jacket glue pot, *below*. Or, put the mixture in a glass jar, then set it in a hot pot (with variable temperature controls) filled with water, *below right*. With both methods, maintain the glue temperature at 135–145 degrees F. Anything hotter over several hours will reduce the glue's strength. Properly prepared hot hide glue should have the consistency of maple syrup.

Add table salt to increase the open time of a batch. Determining the right amount of salt depends on how much open time you want. An amount that equals 5 percent of the dry glue weight gives you an extra 3 to 4 minutes before the glue begins to set. Add up to 20 percent of the dry glue weight for 15 to 18 minutes of open time, and your hide glue will remain liquid at room temperature, just as with synthetic glues. If you're working with small batches of glue, just add a pinch of salt and try it.

## Apply glue while it's hot

Hide glue must be applied in a liquid form, within the 135–145 degree range. Spread it with any style of bristle brush wide enough to make quick work of it. Because your shop and workpieces will be about half that temperature, the glue will begin to gel quickly. Don't worry. Try it on a few test pieces first to get a feel for the set time.

Brush glue onto both surfaces to be joined, then rub them together, if possible, to work out any air bubbles and create a tight bond. Clamp the assembly just as you would with synthetic glues, and then allow it to dry. Wipe off squeeze-out with a wet cloth.

Store leftover glue in an airtight container in your refrigerator, and it will be good to use again and again. Simply reheat it—don't add more water—and it will revert to a liquid. If stored glue becomes watery or moldy, throw it away and mix up a new batch.

### Sources:

**Hide glue:** Dry hide glue, $12–$18/lb or $50–$55/5 lbs plus shipping, Bjorn Industries, 704-953-2026, bjornhideglue.com.
Titebond Genuine Hide Glue, 8 oz, no. 153818, $8, Woodcraft, 800-535-4482, woodcraft.com.
**Glue pot:** No. 849-783, $156, Woodworker's Supply, 800-645-9292, woodworker.com.

Written by **Bob Hunter** with **Eugene Thordahl**

**Combine water and dry hide glue** in an unheated glue pot, then stir to moisten all the glue. Let it stand until it absorbs all the water.

**As the glue pot heats the glue mixture**, stir it with a piece of scrap to get an even consistency.

**Use a candy thermometer** to monitor the temperature of both the water and glue when using a kitchen-style hot pot.

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# My Favorite Specialty Finishes

Like most woodworkers, I have been asked countless times, "What's your favorite finish?" Well, it varies, depending on the project. Here are three finishes I recommend for specific non-furniture uses.

**KEVIN BOYLE**
SENIOR DESIGN EDITOR


## Best for cutting boards

**Walrus Oil cutting board oil**
8 oz., $10; 32 oz., $26; and 1 gallon, $70

Woodworkers get really nervous when it comes to choosing a finish for cutting boards and other food-contact surfaces, such as butcher blocks, bowls, and utensils. One of my new favorites is Walrus Oil. Made of coconut oil, beeswax, and mineral oil, this penetrating oil helps seal wood fibers—especially porous end grain—when applied generously and allowed to dry a few hours or so before use. Depending on how often you use and wash your cutting board, you'll need to reapply Walrus Oil regularly (once or twice a month should do it) to maintain good protection against food particles becoming embedded in the grain.

Walrus Oil
417-848-8598, walrusoil.com

## Best for projects smaller than a breadbox

**Deft aerosol spray lacquer**
Available in 12 oz. spray cans, $6–$9 each

Deft lacquer might be the easiest finish you'll ever apply. First, the easy-to-activate nozzle won't fatigue your finger as quickly as other brands do and has an adjustable spray pattern. Second, this lacquer atomizes perfectly into fine droplets and lays down on the wood surface so well that it quickly blends together for ideal coverage. It takes 2–3 coats to get a finished look, but it dries quickly, so you can do this in less than a day. However, Deft scratches easily, so use it for projects that don't require high durability. You can buy Deft in satin, semigloss, and gloss sheens; I prefer satin because I'm not a fan of shiny finishes.


PPG
800-441-9695, ppg.com

## Best for an exterior door

**General Finishes Exterior 450 water-based topcoat**
Quart $25; gallon $75

Not many clear-coat finishes fare well under the sun's harsh ultraviolet rays, but this one holds up better than most. (General Finishes does not recommend this for horizontal surfaces, so use it only on outdoor projects with vertical surfaces.) It can be brushed or sprayed on, but because it dries so quickly, I recommend spraying to get a smooth, even finish. Because it's water-based, it will raise the grain on unfinished wood, so sand lightly after the first coat to knock down the raised fibers. Additional coats will not require this step.


General Finishes
800-783-6050, generalfinishes.com

*continued on page 73*

inogen

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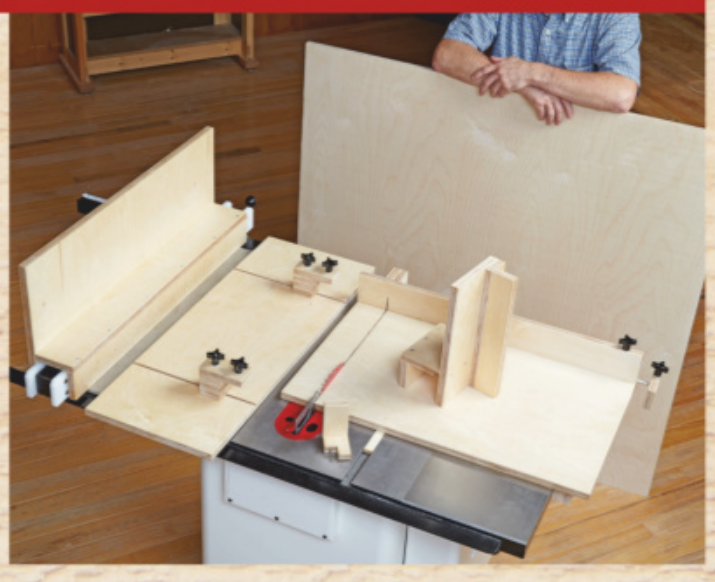

**woodstore.net/bundlebundle**

# Hybrid dust collector delivers high suction for any tool

**Supercell 35-gallon high-pressure dust collector, XSK000035, $2,400**

Oneida's Supercell combines the high suction of a shop vacuum with the dust-particle separation capability of a cyclone dust collector, resulting in a great ducted dust collector for a small shop. By using universal motors and fans—essentially three shop-vacuum motors—this dust collector achieves 90" of water lift, more than double the suction of a typical shop vacuum. That means you can attach any portable power tool with a small dust port—a router, random-orbit sander, or mitersaw, for example—and the Supercell's suction easily overcomes the narrow port and hose that would choke a typical large-port dust collector.

We installed the Supercell in the *WOOD*® magazine shop with 4" ductwork and it's proved up to the task. Even when we swapped out a 25'-long flexible 2½" hose for the 10' length of 4" flex hose normally connected to our benchtop planer, we observed little drop in collection effectiveness. The Supercell lacks the airflow (CFM) of a typical 3-hp cyclone dust collector—we measured airflow at 400–450 cubic feet per minute with duct-and-hose runs of 15' or less—so you'll get better collection on a planer, jointer, or tablesaw by keeping those machines closer to the collector.

The Supercell comes with a HEPA-rated filter that, in our testing, removed even the finest dust particles from the shop air in quick order, even when we sanded MDF. When we let the collector run with two blast gates open—and no other machines running—it scrubbed the air clean in just a couple of hours. That's impressive!

As you might imagine, three shop-vacuum motors can get noisy and, although Oneida did a great job of reducing the noise, you should wear hearing protection when the Supercell is running. It also requires a 220-volt circuit.

*—Tested by Craig Ruegsegger, Deputy Editor, and Tom Brumback*

**Oneida Air Systems**
**800-732-4065, oneida-air.com**

# Milwaukee "nails" next-gen bradder

**18-volt Fuel, 18-gauge brad nailer with 2.0-Ah battery pack and charger, no. 2746-21CT, $400; bare tool, no. 2746-20, $280**

Shortly after we published our review of battery-powered brad nailers in issue 261 (September 2019), I got my hands on Milwaukee's 2746-21CT, the latest generation of its 18-volt Fuel bradder. I ran this nailer through the same tests, and it demonstrated power equal to or better than the best models from that review. The 2746-21CT has excellent balance and handling, thanks to its ergonomic design and 6½-pound weight (with battery). Because it uses a fixed amount of nitrogen to power the piston when triggered, it has instant power—no need to suck in air—without the jarring, sharp recoil typical of most other battery nailers.

This nailer fires ⅝–2⅛"-long brads. A magazine view window shows when the gun is nearly out of fasteners, and a lockout prevents firing when you've got five brads left. When this happens, you can fit a full stick of 100 brads in the magazine.

The safety lockout gives you a generous nine seconds to position the nose before timing out. Setting fastener depth proves easy with a large dial and intuitive indicator. Should a fastener jam in the nose, a lever-action mechanism provides quick access. An LED on the side brightens the area where you intend to nail, and shuts off in 10 seconds. Had this model been available at the time of our category test,


I'm confident it would have earned the Top Tool award for that group. It's that good.

*—Tested by Michael Springer*

**Milwaukee**
**800-729-3878, milwaukeetool.com**


*continued on page 76*

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### 30", 5 Drawer Mechanic's Cart
(1474)

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~~$239.99~~
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Compare to Snap-on Blue-Point KRBC10TBPES $830

- 15,000 cu. in. of storage
- 700 lb. capacity
- Heavy duty locking casters

ITEM 56429, 64722, 64033, 64721, 64059, 64720, 64031

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### Multipurpose Scissors
(5603)

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Compare to Cuisinart C77-SHR8B $5.99


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WOW! 39¢

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16688567 Exp. 9/10/20*

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## SUPER COUPON
BRAUN (7586)
### 5000 Lumen 4 ft. LED Hanging Shop Light


Save 33%

**$19.99**
~~$29.99~~

ITEM 64410

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## SUPER COUPON
Bauer (872)
### 5" Heavy Duty Random Orbital Sander

**$24.99**
~~$34.99~~
Save 49%

ITEM 63999

Compare to Ryobi RS290G $49.97

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16717269 LIMIT 2 - Exp. 9/10/20*

## SUPER COUPON
(2004)
### 7 ft. 4" x 9 ft. 6" All Purpose/Weather Resistant Tarp

**$2.99**
~~$4.99~~
Save 65%


ITEM 69115/69121/69129 69137/69249/877 shown

Compare to Blue Hawk BG8X10-Y $8.78

Use Online & In-Store
16732178 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
PITTSBURGH (364)
### 24" Clamp Edge and Saw Guide
LIFETIME WARRANTY


**$9.99**
~~$13.99~~
Save 85%

Compare to Bora 543030K $70.28
ITEM 66126

Use Online & In-Store
16742294 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
HaulMaster (4598)
### 18" Working Platform Step Stool

**$19.99**
~~$29.99~~
Save 50%

Compare to Neocraft 60635 $39.99

ITEM 62515/66911 shown

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16748518 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
### Safety Glasses
(1443)

Smoke Lens
ITEM 66822

Yellow Lens
ITEM 66823

Clear Lens
ITEM 63851/99762 shown


YOUR CHOICE
**$1.29**
~~$1.99~~
Save 78%

Compare to 3M 90552-00000B $5.96

Use Online & In-Store
16760493 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
WARRIOR (1057)
### 18v Lithium-Ion 3/8" Drill/Driver Kit

**$27.99**
~~$34.99~~
Save 62%


Compare to Ryobi P1810 $74

ITEM 56122/64118 shown

Use Online & In-Store
16757907 LIMIT 2 - Exp. 9/10/20*

## SUPER COUPON
CENTRAL PNEUMATIC (3744)
### 3 Gallon, 100 PSI Oil-Free Air Compressors
YOUR CHOICE
**$39.99**
~~$54.99~~
Save 59%

Hot Dog ITEM 69269 97080 shown
Pancake ITEM 61615/60637 95275 shown

Compare to Porter-Cable PCFP02003 $98.62

Use Online & In-Store
16766281 LIMIT 2 - Exp. 9/10/20*

## SUPER COUPON
Bauer (325)
### 15 AMP, 12-1/2" Portable Thickness Planer

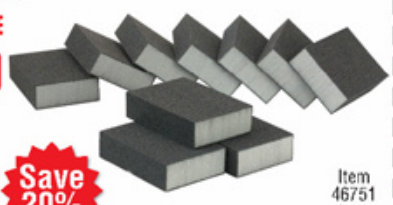
**$299.99**
~~$349.99~~
Save $149


Compare to Dewalt DW734 $449

ITEM 63445

Use Online & In-Store
16772334 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON
Lifetime CARBIDE (201)
### Aluminum Oxide Sanding Sponges Pack of 10
YOUR CHOICE
**$3.99**
~~$4.99~~
Save 20%


Item 46751 shown

Coarse ITEM 46751/63918
Medium ITEM 46752/63915
Fine ITEM 63912/46753

Use Online & In-Store
16783575 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
AVANTI (281)
### HVLP Handheld Paint Sprayer

**$69.99**
~~$99.99~~
Save $30


ITEM 64934

Use Online & In-Store
16784493 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON
Apache MODEL 1800 (1236)
### Ultra-Light, Crush-Proof, Weather-Resistant Lockable Case

**$9.99**
~~$12.99~~
Save 74%

Case contents and locks not included.

Compare to Pelican 1150 $39.95

ITEM 64550 63518 shown

Use Online & In-Store
16788081 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON
PITTSBURGH AUTOMOTIVE (3941)
### Pneumatic Adjustable Roller Seat

**$19.99**
~~$27.99~~
Save 71%

Compare to Duralast TR6201C $69.99

ITEM 61160 63456/46319 shown

Use Online & In-Store
16794496 LIMIT 3 - Exp. 9/10/20*

## SUPER COUPON
PORTLAND (6507)
### 7 AMP Electric Pole Saw 9.5" Bar


Save $39

**$59.99**
~~$79.99~~

ITEM 68862/62896/63190/56808 shown

Compare to Worx WG309 $99.98

Use Online & In-Store
16794615 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON
HaulMaster
### 132 lb. Capacity Roller Stand
(1070)

**$11.99**
~~$17.49~~
Save 75%

Compare to Portamate PM-5083T $48.53

ITEM 68898

Use Online & In-Store
16807412 LIMIT 3 - Exp. 9/10/20*

## SUPER COUPON
CHICAGO ELECTRIC WELDING (479)
### 170 AMP MIG/Flux Cored Welder

**$169.99**
~~$189.99~~
EVERYTHING YOU NEED TO WELD
Save $530

Compare to Hobart 500554 $699.99

ITEM 62711/61888 56835/57302 68885 shown

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16808766 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

**HARDY**

### Mechanics Gloves

AVAIL. IN SM, MED, LG, XL, XXL

(279)

$4.99

~~$5.49~~

Save 66%

Compare to Valeo 25521 $14.99

ITEM 62434, 62426, 62433, 62432, 62429, 64179, 62428, 64178 shown

Use Online & In-Store

16814670 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**PITTSBURGH**

### 6" Digital Caliper

(852)

Includes two 1.5v SR44 button cell batteries.

SAE AND METRIC

$9.99

~~$17.99~~

Save 66%

Compare to Husky 1467H $29.97

ITEM 63711/61585 62387/47257 shown

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16831982 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**BETTER** Superior Features and Accuracy **ADMIRAL**

### 12" Dual-Bevel Sliding Compound Miter Saw with LED and Laser Guide

(784)

- 6-1/2" Vertical Crown Molding Capacity
- 4-1/2" Tall Sliding Fences
- Laser Guide Light & led work light

$179 ~~$199.99~~

SAVE $90 COMPARE TO RYOBI $269 MODEL: TSS120L

FREE BLADE INCLUDED $19.99 VALUE

ITEM 64686

Use Online & In-Store

16832544 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

**BEST** Jobsite Features and Accuracy **HERCULES**

### Professional 12" Dual-Bevel Sliding Compound Miter Saw with LED Shadow Guide

(791)

- 7-1/2" Vertical Crown Molding Capacity
- 4-3/4" Tall sliding fences
- LED Precision Shadow Guide Light

$329 ~~$349.99~~

SAVE $270 COMPARE TO DEWALT $599 MODEL: DWS780

FREE BLADE INCLUDED $44.99 VALUE

ITEM 56682/63978 shown

Use Online & In-Store

16890456 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

### 200 Lumen LED Super Bright Flip Light

(5622)

$1.99

~~$3.99~~

Save 60%

Compare to Premier SW-SWITCH-12/24 $4.99

ITEM 63922 64189/64723 shown

Use Online & In-Store

16892576 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

### 7" Bench Brush

(2378)

$1.49

~~$1.99~~

Save 90%

ITEM 62617/1072 shown

Compare to Tough Guy 1A849 $16.36

Use Online & In-Store

16892684 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**Grant's GARAGE** Mechanic's Choice

### 14" x 13" Shop Towels Pack of 50

(928)

$8.99

~~$11.99~~

Save 50%

ITEM 63365/64730/56119/63360 shown

Compare to Viking 874900 $17.98

Use Online & In-Store

16893520 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**CHICAGO ELECTRIC POWER TOOLS**

(2651)

### Mobile Miter Saw Stand


$99.99

~~$124.99~~

Save $69

ITEM 63409/62750 shown

Compare to Hitachi UU240F $169

Use Online & In-Store

16895220 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

**DIAMONDBACK**

(308)

### 7" Tile Saw with Sliding Table

$239.99

~~$269.99~~

Save $99

Compare to Kobalt KWS-S7-06 $339

ITEM 64683

Use Online & In-Store

16897361 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

**PITTSBURGH**

(1772)

LIFETIME WARRANTY

### 4" Ratcheting Bar Clamp/Spreader

99¢

~~$1.99~~

Save 84%

ITEM 46805/62242/68974 shown

Compare to Irwin 1964747 $6.49

Use Online & In-Store

16906664 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**Bauer**

NEW

### 6 Gallon, 4 Peak HP Wet/Dry Vacuum

(283)

$44.99

~~$54.99~~

Save 41%

Compare to Dewalt DXV06P $76.63

ITEM 56201

Use Online & In-Store

16915233 LIMIT 3 - Exp. 9/10/20*

## SUPER COUPON

**drill master**

(5867)

### 4-1/2" Angle Grinder

$9.99

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Save 44%

Compare to Performax 2411-1 $17.99

ITEM 69645/60625 shown

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16922479 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**Haul Master**

(4898)

### 4 Piece, 1" x 15 ft. Ratcheting Tie Downs

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~~$12.99~~

Save 69%

ITEM 90984/61524/63056 63057/63150/56668/63094 shown

Compare to Keeper 5505 $22.80

Use Online & In-Store

16925956 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**Bauer**

### 6.5 AMP Corded Trim Router

(83)

$59.99

~~$69.99~~

NEW

Save $39

Compare to Makita RT0701C $99

ITEM 64944

Use Online & In-Store

16929442 LIMIT 2 - Exp. 9/10/20*

## SUPER COUPON

**WARRIOR**

(633)

### 11 Piece, 1" - 2-1/2" Carbon Steel Hole Saw Set

$5.99

~~$9.99~~

Save 76%

ITEM 69070/68114 shown

Compare to Westward 45EG81 $25.20

Use Online & In-Store

16934347 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**CENTRAL PNEUMATIC**

(326)

### 3/8" x 25 ft. Retractable Air Hose Reel

$39.99

~~$54.99~~

Save $110

ITEM 46104/69266 64682/57393/69234 shown

Compare to Coxreels 464125 $149.99

Use Online & In-Store

16943392 LIMIT 3 - Exp. 9/10/20*

## SUPER COUPON

**CENTRAL MACHINERY**

### Foldable Sawhorse

(2972)

$8.99

~~$12.99~~

Save 50%

Compare to Stanley STST11200 $17.99

ITEM 60710/61979 shown

Use Online & In-Store

16946864 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**CHICAGO ELECTRIC POWER TOOLS**

(384)

### Benchtop Router Table with 1-3/4 HP Router

$94.99

~~$114.99~~

Save $44

Compare to Skil RAS900 $139

ITEM 95380

Use Online & In-Store

16947637 LIMIT 1 - Exp. 9/10/20*

## SUPER COUPON

**WARRIOR**

(31)

### 1500w Dual Temperature Heat Gun (700°-1000°)

$8.99

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NEW

Save 67%

Compare to Black+Decker HG1300 $28.06

ITEM 56433/56434 shown

Use Online & In-Store

16951660 LIMIT 4 - Exp. 9/10/20*

## SUPER COUPON

**CHICAGO ELECTRIC WELDING**

### MIG/Flux Welding Cart

(2581)

$29.99

~~$39.99~~

Save $70

Welders, tools & supplies sold separately.

Compare to Forney 117535099 $99.99

ITEM 61316/131 60790/69340 shown

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16952437 LIMIT 2 - Exp. 9/10/20*

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**Gramercy Tools bevel gauge: stainless steel, no. GT-BEV.SS, $9.95; brass, no. GT-BEV.BR, $33.95**

These gauges measure the bevel angle of chisels and plane irons at 18 angle settings, from 10° to 45°, in 2½° increments. The stainless-steel version is 1/64" thick, with markings on one side. The thicker brass version (1/16") has markings on both sides. Both have a hole for hanging when not in use.

**800-426-4613, toolsforworkingwood.com**


## Minwax oil stains now dry faster

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Minwax's oil-based penetrating stains have historically taken four or more hours to dry thoroughly. Minwax says its new formulation cuts that wait time to two hours, allowing you to add a topcoat in the same day. (This new formula replaces the existing line of oil-based stains.)

**800-523-9299, minwax.com**


## DeWalt adds orbital sander to cordless lineup

**20-volt ¼-sheet orbital sander kit with 2.0 Ah battery and charger, no. DCW200D1, $199; kit with 5.0 Ah battery and charger, no. DCW200P1, $249; bare tool, no. DCW200B, $129**

DeWalt's 20-volt ¼-sheet orbital sander has a variable-speed motor to alter pad speed from 12,000 to 14,000 orbits per minute. The hook-and-loop pad has dust-collection holes in it and clamps for securing sandpaper.

**800-433-9258, dewalt.com**

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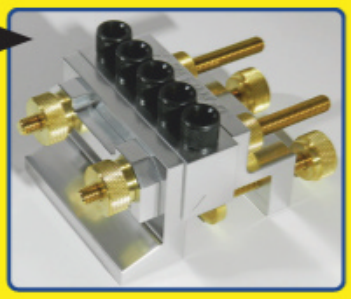

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# What's Ahead

## A GLIMPSE INSIDE THE OCTOBER ISSUE (ON SALE AUGUST 7)

**Farmhouse-style dining table**
The perfect complement to the sideboard on *page 22*, it's built to withstand the heartiest holiday feast.

**Entryway valet**
This compact catch-all corrals keys and other grab-as-you-go items.

**Limbert-style bookcase**
Build an Arts-and-Crafts classic, complete with a glazed-and-paneled door and gallery top.

**Shop Test: Big-swing drill presses**
These powerful, feature-packed presses can bore into the middle of a workpiece 17" or wider.


**Get the most from your jointer**
Jim Heavey demonstrates tips and tricks to make your machine a flat-out top performer.

**Get to know the stones**
There's no satisfaction like tools sharper than Jagger. Learn which stones deserve a role in your sharpening regimen.



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